M.C. HOLLAND

OWNER'S MANUAL

THE PRISM PRINTER™

PRISM 80 AND PRISM 132

By

THE INNOVATOR IN IMAGING

Integral Data Systems, Inc.

Milford, New Hampshire 03055 (603) 673-9100

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Pric

THE PRISM PRINTER™ PRISM 80 AND PRISM 132

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Integral Data Systems, Inc.

Milford, New Hampshire 03055 (603) 673-9100

Part No. 9000-002-340
Third Printing

March

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Third Printing, March 1982
Printed in U.S.A.

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PREFACE

This manual describes how to use the Integral Data Systems PRISM 80 or PRISM 132 Printer with your computer to produce high quality printed copy. Please read through the manual to become familiar with the printers characteristics, capabilities and modes of operation before attempting to operate the printer. We also suggest that you perform the printing exercises and run the sample programs provided in the manual before proceeding with your printing applications.

The manual is formatted to get you going as quickly as possible. The manual takes you through a logical sequence, starting with unpacking and a "let's get acquainted" illustrated description of the basic printer, then progressing from setup and a self-test through operation and care of the printer.

To accomplish this, we organized the manual into eight short sections plus appendices. Section 1 contains a brief, general description of the basic printer, and identifies and shows locations of key operational areas. The section also includes a summary of the printers specifications and lists the options you may purchase.

Section 2 describes how to initially set-up and check-out the printer. We have included procedures for connecting to ac power and operating the printer by itself in the self-test mode. This serves two purposes: you immediately see the printer operate and you get a sample printout showing you all the available printable characters and the high quality of the characters.

Section 3 describes how to connect the printer to your computer, and includes procedures and suggestions for selecting and connecting the interface between the printer and computer.

Section 4 shows locations and gives descriptions of all operator controls and indicators. Also included are descriptions of the function select switches, and an exercise for familiarizing you with the printer controls.

Section 5 tells you how to operate the printer with continuous sheet pinfeed paper. We explain how to load pinfeed paper, adjust the print head and paper margins, and set the top-of-form position.

Section 6 describes how to use the printer with software control codes and how to program various additional printer functions. A sample program is provided for your use in becoming familiar with these functions.

Section 7 includes information for keeping your printer in optimum condition for years of continuous, error-free performance. Procedures are included for cleaning the printer, and replacing the ribbon cartridge.

Section 8 tells you what to do if the printer develops problems. While the printer is a reliable, dependable device, problems sometimes occur. To help you keep the printer operating, we have included a summary of problems you may encounter and their probable causes. We have also included a brief functional description of the printer.

The appendices include operating procedures for the options available for the printer, and procedures for selecting international character sets.

Finally, on the inside of the back cover, we have provided a summary of the control codes for operating the printer via your computer.

NOTE

This manual is provided for information purposes only. All information contained within the manual is subject to change without notice. Integral Data Systems, Inc., assumes no responsibility for any errors which may be contained within this manual.

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IMPORTANT!
UNPACKING AND WARRANTY INFORMATION

Before attempting to operate the printer, carefully read and perform the following unpacking procedures. Also read through the warranty section to see what the warranty covers.

UNPACKING

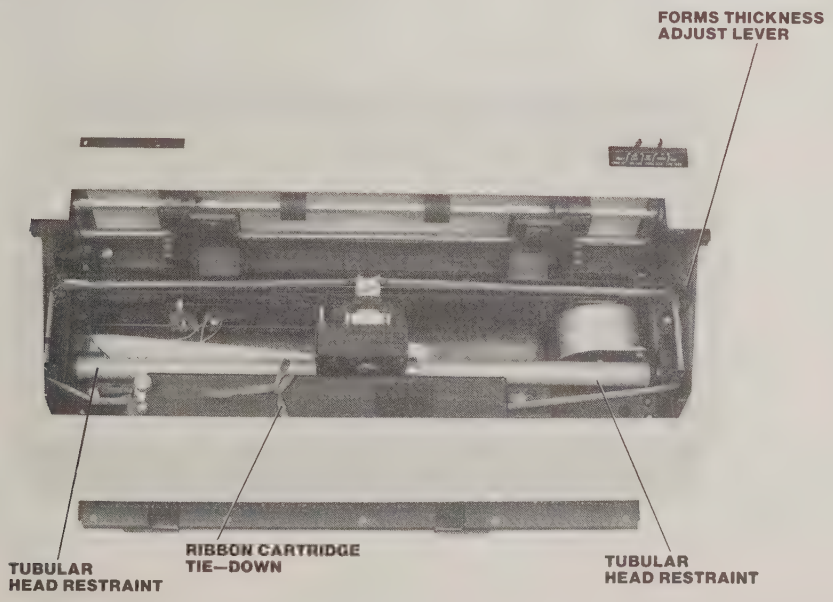
As you discovered when you opened the shipping carton, there was a plastic bag containing this manual, a supply of paper, and a test pattern. Retain this material as you will use it during the printer checkout.

If you haven't done so already, remove the top piece of shock absorbing molded foam from the carton. Carefully remove the printer from the carton. Take the printer out of its protective plastic bag and remove the cardboard base from the bottom of the printer.

Visually check the printer for any obvious damage. If you find any damage, contact the store you purchased the printer from or the shipping agent who delivered the printer.

Remove the plastic window on the front of the printer by grasping the top edge of the window and pulling it forward and up. The window is held in place at the top and bottom by "bullet catches." Observe that there is a DO'S/DON'TS card placed on the printer carriage. Remove the card and read it. The card outlines several important points regarding printer operation. The card also tells you what line voltage the printer is configured for. If the voltage does not conform to your line voltage, refer to Section 2 in this manual for procedures to reconfigure the printer.

While referring to the photograph below, locate the print head and the restraining tube on each side of the head. Remove each tube by pulling it up and off the carriage shaft. Locate the ribbon cartridge and the plastic tie-down securing the cartridge to the printer; untwist and remove the tie-down. Keep the shipping carton and all the packing material for future printer storage or shipping. Reinstall the window by placing the bottom of the window in the recess in the cover, then carefully push the window down until it locks in place.



NOTE
THE PRISM 132 PRINTER IS SHOWN; THE PRISM 80 IS SIMILAR, DIFFERING ONLY IN SIZE, WEIGHT AND CARRIAGE WIDTH.

Printer Shipping Restraints

REPACKING

The following repacking information will be helpful for storing or shipping your printer. We have included repacking procedures for using the original shipping materials or, if the materials were not retained, repacking procedures using readily obtained materials.

CAUTION

You are responsible for packing the printer properly. Shipping companies wil refuse payment for damage to an improperly packed printer.

When using the original shipping materials, remove the printer window, center the print head and carriage on the carriage shaft and place a tubular head restraint on each side of the print head, over the shaft. Position the Forms Thickness Adjust Lever all the way towards the front of the printer to move the print head away from the ribbon. Secure the ribbon cartridge in place using a plastic tie-down.

Install the printer window. Place the rubber feet of the printer in the holes located in the cardboard base shipping plate, then place the printer in the plastic shipping bag. Slip the molded foam shock absorbing material over the top and bottom of the printer. Slide the printer into the shipping carton. Assure that the top of the printer is at the top of the shipping carton as indicated by the printing on the carton. Seal the carton with strong shipping tape.

If the original shipping materials were not retained, obtain a strong carton large enough to hold the printer.

Remove the printer window then, using the Forms Thickness Adjust Lever, move the print head back from the ribbon as far as it will go. Move the print head to the left side of the frame, and secure it in place with a plastic tie down. Secure the ribbon cartridge in place with a plastic tie down.

Tape a heavy piece of cardboard (cut to just fit inside the carton) beneath the base and rear opening of the printer. Place the printer in a heavy plastic bag, tape the bag closed, and put the printer in the box.

Surround the printer with a packing material that cannot shift. Preferred packing materials are bubble pack and heavy pieces of foam rubber. Loose foam packing pellets or newspaper is unacceptable. Sufficient packing material must be used so that the printer cannot shift within the carton. Seal the carton with strong shipping tape.

WARRANTY INFORMATION

For a period of ninety (90) days from the date of purchase (within Continental United States, Alaska, and Hawaii only), Integral Data Systems, Inc. warrants to the original purchaser that the PRISM Printer™ (PRISM 80 or PRISM 132) shall be free from manufacturing defects. In addition, for a period of one year from the date of purchase (within Continental United States, Alaska and Hawaii only), Integral Data Systems warrants to the original purchaser that the print head of the PRISM Printer™ (PRISM 80 or PRISM 132) shall be free from manufacturing defects.

If a defect occurs during the warranty period, Integral Data Systems, Inc. or its duly Authorized Service Centers shall, without charge to the original purchaser, adjust, repair, or replace any defective parts which are determined to be defective within the warranty period. The defective printer must be returned to an Integral Data Systems, Inc. Authorized Service Center, along with the dated Proof of Purchase.

NOTE

The warranty Card packed with the PRISM Printer™ must be properly filled out and returned to Integral Data Systems, Inc. for prompt warranty service.

If it becomes necessary to return the printer to Integral Data Systems, Inc., you must first obtain authorization from:

Integral Data Systems, Inc.
Customer Support Group
Milford, New Hampshire 03055
Telephone 1-800-258-1558 (Toll Free)

Correction of defects shall be at the discretion of Integral Data Systems, Inc. and its Authorized Service Centers as to adjustment, repair or replacement.

This warranty shall be void if the PRISM Printer™ is sold or transferred by the original purchaser to a second party. This warranty shall be void if the PRISM Printer™ is subjected to improper or abnormal use or if the PRISM Printer™ was altered or modified from its original, as manufactured, configuration (excluding options).

Integral Data Systems, Inc. has a nationwide network of independently owned Service Centers that offer quick, convenient, and reliable repair services for all its products. These centers will perform all warranty service as outlined above. Non-warranty service will also be provided at reasonable parts and labor costs.

PRISM 80

PRISM 132

Figure 1-1. The PRISM Printers™

SECTION 1
GETTING ACQUAINTED

The IDS PRISM 80 and PRISM 132 Printers™ (see Figure 1-1) are intelligent, microprocessor-based, dot matrix, impact printers fully compatible with most personal and small-to-medium size business computers. Each printer features correspondence quality printing approaching that of more expensive printers.

The basic printer configuration is a low-profile, 80 column (PRISM 80) or 132 column (PRISM 132) printer using conventional, pinfeed fanfold paper. Each printer uses the 96 character U.S. ASCII character set for its standard print character format, and includes upper and lower case characters with true descenders. The printer also has resident English, French, Norwegian, German, Swedish and Spanish character sets.

The printer has switch and software control capabilities. This allows you to choose from a wide variety of standard built-in functions to meet requirements of text and data processing in industrial, commercial, business, government, science, educational and personal computing applications.

To enhance the capabilities of the basic printer, we offer several low cost option packages that allow you to custom configure the printer to best suit a given application or allows you to "add-on" as your requirements change. Options available include semi-automatic single-sheet friction feed, Dot Plot™ Graphics, Sprint Mode™ (high speed) printing, and Prism Color™. With the color and graphics options you can print vivid, attention-getting color graphs, charts or illustrations. Add the Sprint printing option and you can print draft text and data at speeds over 200 characters per second as well as the standard correspondence quality text at 110 to 150 characters per second. With the semi-automatic single sheet friction feed option, you can print directly onto your letterhead paper, pre-printed forms or other single-sheet paper.

NOTE

As the PRISM 80 and PRISM 132 Printers™ generally differ only in size, weight and carriage width, the descriptions and procedures in this manual are applicable to either printer. Where differences do exist, they are noted as they occur. Further, the sections in this manual describe the basic printer (no options installed); if your printer has any options, refer to the appropriate appendix in the back of this manual for descriptions and procedures.

1.1 A LOOK AT THE PRINTER

Take a few minutes to orient yourself with the general arrangement of the printer before operating it. Figure 1-2 (PRISM 80) or Figure 1-3 (PRISM 132), depending on which printer you have, will help you quickly identify the key operational areas of the printer. Table 1-1 lists the physical, electrical, environmental and functional specifications of the basic printer.

The printer is a table-top unit with a removable plastic window that allows quick paper loading, forms thickness adjustments, and ribbon cartridge replacement. The printer uses a pre-inked black ribbon packaged in a disposable cartridge. Paper used with the printer is standard single-part pinfeed paper or up to six-part forms. Pinfeed paper or forms are loaded into the printer from the back or bottom.

Except for the power ON/OFF switch, the 115/230 Vac select switch and the Forms Thickness Adjust Lever, all controls and indicators are at the top of the printer for operator convenience and accessibility. The power ON/OFF switch is on the back panel of the printer; the voltage select switch is under the printer cover. The Forms Thickness Adjust Lever is on the right side of the printer, under the window.

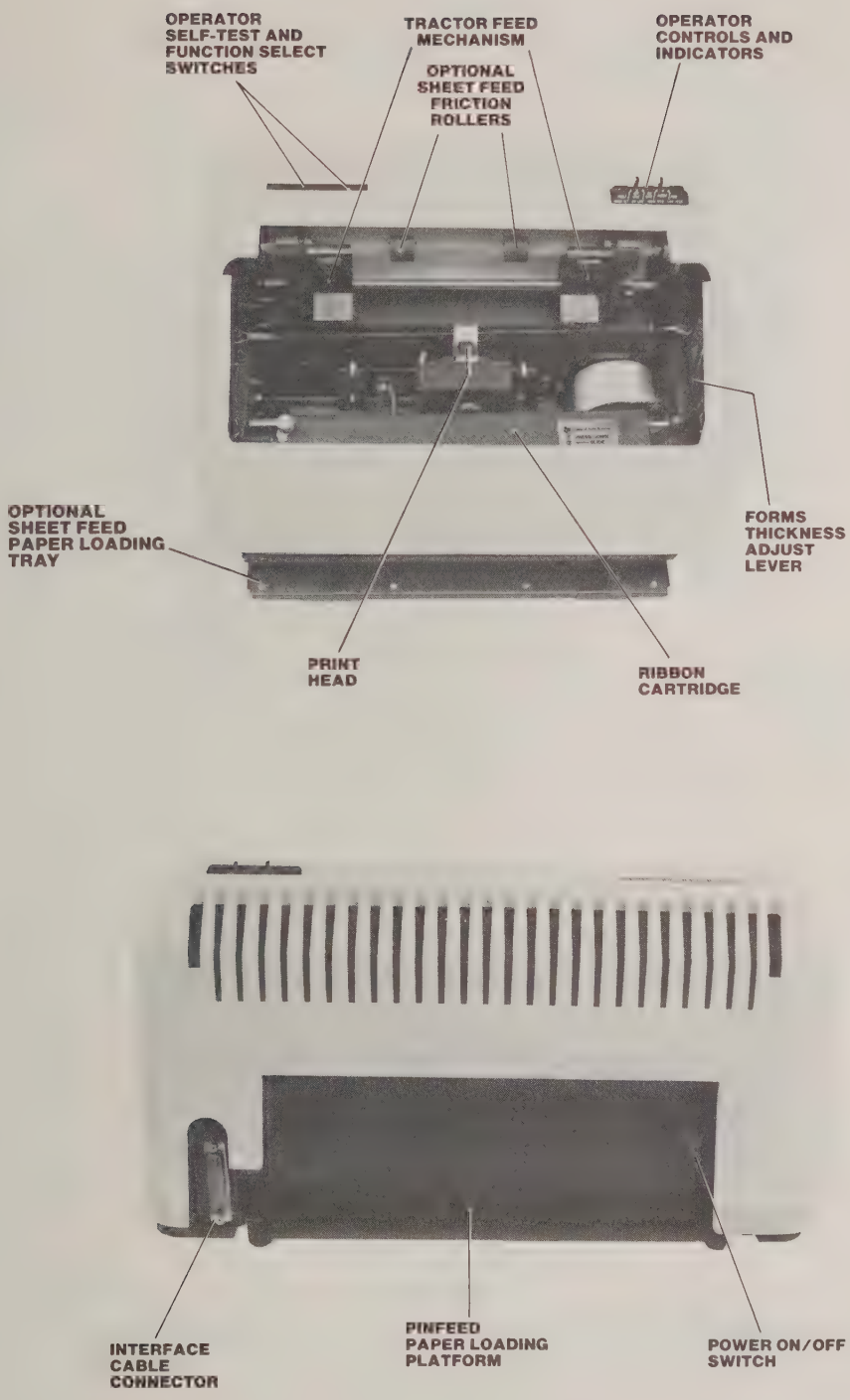
The printer requires only an ac power source (115 Vac, 60 Hz or 230 Vac, 50 Hz), your computer, a parallel or serial interface circuit board and a parallel or serial interface cable. The interface cable connector is conveniently located at the back of the printer.

We have built in several self-tests to give you complete confidence in printer performance. These include an internal diagnostics program that automatically performs a microprocessor and memory test each time power is turned on and an operator-initiated self-test that provides a visual indication of print quality through a test pattern printout.

Internally, the printer consists of a microprocessor-based controller circuit board, a power supply circuit board, and three electro-mechanical subsystems: print, paper feed and ribbon feed.

1.2 OPTIONS AND ACCESSORIES

Integral Data Systems, Inc. offers a variety of printer options, as listed in Table 1-2. Contact your IDS dealer for information on option pricing and installation. Your dealer also has numerous accessory items for the PRISM Printer™; contact the dealer for the latest listing of available accessories.

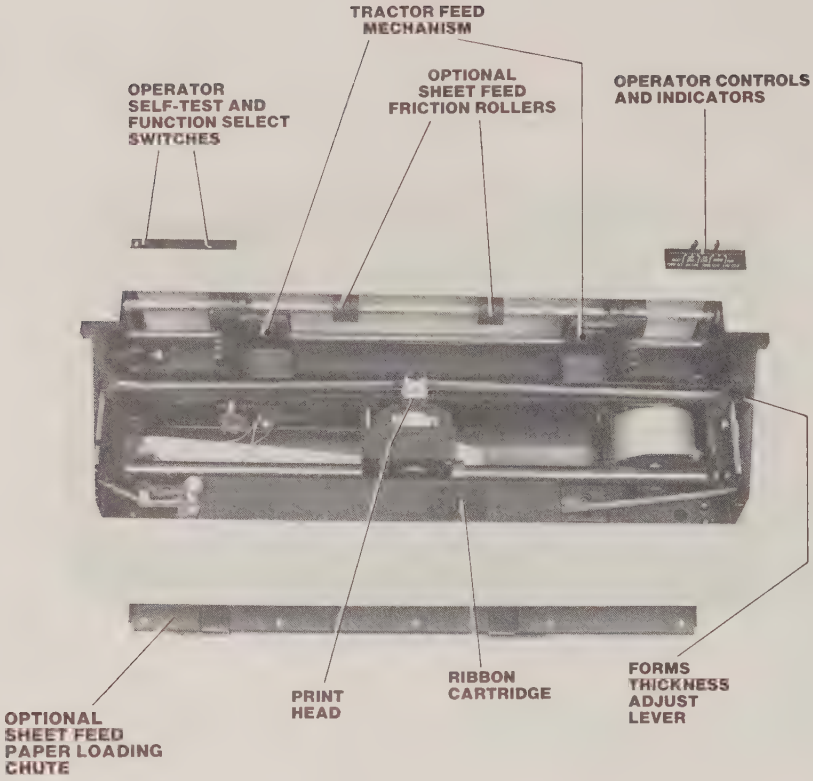


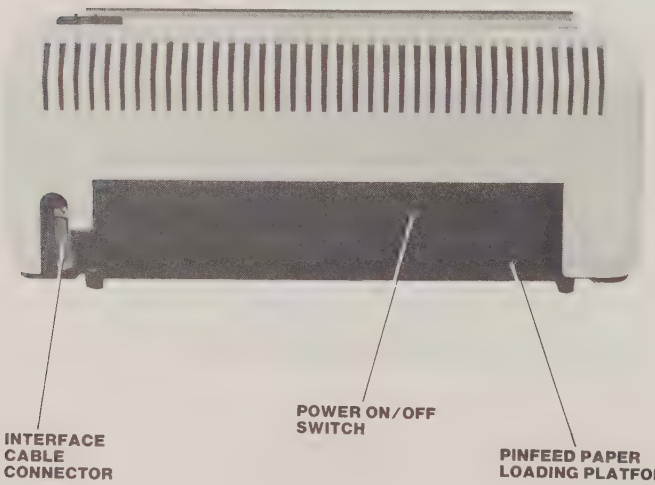
NOTE
PRINTER IS SHOWN WITH SEMI-AUTOMATIC SINGLE-SHEET FEED OPTION INSTALLED.

Figure 1-2. PRISM 80 Printer

RONT
IEW,
VINDOW
FF

ACK
EW


TRACTOR FEED MECHANISM
OPERATOR SELF-TEST AND FUNCTION SELECT SWITCHES
OPTIONAL SHEET FEED FRICTION ROLLERS
OPERATOR CONTROLS AND INDICATORS
OPTIONAL SHEET FEED PAPER LOADING CHUTE
PRINT HEAD
RIBBON CARTRIDGE
FORMS THICKNESS ADJUST LEVER



NOTE
PRINTER IS SHOWN WITH SEMI-AUTOMATIC SINGLE SHEET FEED OPTION INSTALLED.

Figure 1-3. PRISM 132 Printer

Table 1-1
Basic Printer Specifications

NOTE

This table lists the specifications for the basic printer with no options installed; refer to Table 1-2 for option specifications and features.

Physical

PRISM 80	
Height	9.1 in. (23.1 cm)
Width	16.6 in. (42.1 cm)
Depth	12.4 in. (31.5 cm)
Weight	24.5 lbs. (11.1 kg)
PRISM 132	
Height	9.1 in. (23.1 cm)
Width	21.6 in. (54.9 cm)
Depth	12.4 in. (31.5 cm)
Weight	29 lbs. (13.2 kg)

Electrical

Voltage	Switch selectable: 115/230 Vac
Power	125 watts

Environmental

Temperature	
Operating	41°F (5°C) to 104°F (40°C)
Storage	32°F (0°C) to 140°F (60°C)
Transient	-104°F (-40°C) to 140°F (60°C)
Relative Humidity	
Operating	20 to 80%
Storage	10 to 90%
Transient	95% maximum
Altitude	
Operating	-1312 ft. (-400 m) to 9842 ft. (3000 m)
Storage	-1312 ft. (-400 m) to 9842 ft. (3000 m)
Transient	0 ft. (0 m) to 32,808 ft. (10,000 m)

Print Head

Ballistic type, staggered nine wire head with wires arranged in two vertical columns: 5 wires in one column, 4 wires in the second.

Table 1-1
Basic Printer Specifications (Cont'd.)

Acoustic Characteristics	Acoustically insulated, structural foam case; noise level 63 dBa.
Ribbon	Cartridge type with 36 yards of ¾ inch wide, continuous loop, pre-inked black nylon ribbon.
Paper Type	
Pinfeed	Continuous single-part fanfold sheets (15 to 20 lb. bond) or up to 6-part forms (12 to 15 lb. bond and 6 to 8 lb. carbons) with a width ranging from 5.0 inches minimum to 9.5 inches maximum (including perforations) for the PRISM 80 and up to a maximum width of 14⅞ inches (including perforations) for the PRISM 132.
Interface	
Serial	EIA RS-232-C (XON/XOFF).
Parallel	Centronics Compatible TTL level.
Serial Baud Rate	
Switch Selectable	300, 1200, 2400, 9600 bits per second (bps) standard.
Line Buffering	
Automatic	Multiple line buffering of 1500 bytes.
Print Format	
Bidirectional Printing	Logic seeking, bidirectional printing for maximum printer throughput.
Print Matrix Cell	24x9 dot matrix in normal print mode or 48x9 in enhanced (double-width) print mode.
Character Format	
Data	Asynchronous bit serial: 1 start with 7 data plus 1 parity and 1 stop bit. (Parity bits are checked for odd, even or none via switch selection.)
Set	Full 96 character ASCII printable character set with true lower case descenders, and ASCII control characters for printer control functions. Upper case characters are 0.090 inches high.
Density	*Switch selectable:* 10, 12 or 16.8 characters per inch (cpi) plus enhanced (double-width) characters at 10 cpi. *Software selectable:* 10, 12 or 16.8 cpi plus enhanced characters at each density.
Fixed and Proportional Spacing	*Software selectable:* fixed or proportional.
Justified Text	*Software selectable:* justified left and right margins.
Intercharacter Spacing	*Programmable:* adjustable space between characters in 1/24 of a character width increments for 10 cpi, and 1/25 increments for 12 and 16.8 cpi.

Table 1-1
Basic Printer Specifications (Cont'd.)

Line Format	
Length	
PRISM 80	80, 96 or 132 characters across an 8-inch print width with fixed spacing at 10, 12 or 16.8 cpi, respectively; more when using proportional spacing.
PRISM 132	132, 158 or 221 characters across a 13.2 inch print width with fixed spacing at 10, 12 or 16.8 cpi, respectively; more when using proportional spacing.
Spacing	*Switch selectable:* 6 or 8 lines per inch.
	Software selectable: Line spacing in 1/48 inch vertical increments, up or down.
Page Format	
Forms Length	*Switch selectable:* 3, 3.5, 4, 7, 8.5, 11, 12 and 14 inch with switch selectable automatic 1 inch perforation skip.
	Programmable: any practical length.
Margins	*Manual:* left and right.
	Programmable: top, bottom, left, right margins in 1/48 inch vertical and 1/120 inch horizontal increments.
Tabs	*Programmable:* up to eight vertical tabs in 1/48 inch increments and up to eight horizontal tabs in 1/120 inch increments.

Table 1-2
Printer Options

Option	Features
Semi-Automatic Single Sheet Friction Feed	Permits use of single sheet, 15 to 25 lb. bond paper for direct printing onto letterhead paper, pre-printed forms or other single sheet paper. All basic printer functions equally applicable with single sheet friction feed option. *Single Sheet Paper size:* 7.0 inches to 8.5 inches maximum width by 8.5 inches to 17.0 inches maximum length for the PRISM 132; 7.0 inches to 8.5 inches maximum width by 8.5 inches to 17.0 inches maximum length for the PRISM 80. *Paper loading and positioning:* manual insertion, one sheet at a time, through a paper loading chute at the front of the printer; automatic paper positioning to first printable line. *Paper feed selection:* friction feed or tractor feed manually selected by lever. Adjustable paper guides for paper centering and margin setting. Automatic ejection of paper at end of page; operator initiated paper ejection at any time.
Dot Plot™ Graphics	Permits printing of illustrations, graphs, charts, etc. *Graphics resolution:* 84 dots per inch, both vertically and horizontally.
Sprint Mode™ (High Speed Printing)	Permits high speed draft printing at over 200 characters per second, as well as standard correspondence quality text printing at up to 150 characters per second. All basic printer functions equally applicable with Sprint Mode™ high speed option. *Character pitches:* 10, 12, 13.3 and 16.8 cpi (plus enhanced). *Dot matrix:* 18x9 for draft, 24x9 for correspondence. Draft or correspondence font is switch or software selectable; character pitch is switch or software selectable.
Prism Color™	Permits printing of text and data in up to eight different colors. All basic printer functions equally applicable with color printing option. *Color ribbons:* Process color (yellow, magenta, cyan and black) ribbon for color mixing; Primary color (red, green, blue and black) ribbon; and an all black ribbon. The Process ribbon is supplied with the color option; the Primary and black ribbons are available as accessory items. Color selection is programmable, with an average shift time between colors of 100 milliseconds.

SECTION 2
CHECKING OUT THE PRINTER

This section describes how to connect the printer to an ac power source and check out the printer through its self-test feature. By performing the self-test, you will exercise the electro-mechanical subsystems as a preoperational check and provide a visual check of print quality through actual printout of the preprogrammed test pattern. The test pattern is a repetitive printout of all the printable characters in the 96 character ASCII character set.

All you need to perform the printer checkout is the printer, an ac power source (115 Vac or 230 Vac), and the blank paper samples packed with the printer. You do not need your computer to run self-test as the test program is an integral part of the printer.

2.1 CONNECTING AC POWER

The printer is normally shipped configured for 115 Vac, 60 Hz operation. (If your power source is 230 Vac you must reconfigure the printer for 230 Vac operation as explained in paragraph 2.3.) The printer comes complete with an ac line power cord and 3-wire grounded plug.

> **NOTE**
>
> *Ensure that the print head and ribbon cartridge shipping restraints have been removed (see* Unpacking *procedures) before operating the printer.*

To connect power:

a. Check that the power ON/OFF switch on the back of the printer is at OFF.

b. Insert the line cord plug into a 3-wire grounded 115 Vac receptacle.

> **NOTE**
>
> *Do not operate the printer without the ground wire connected.*

2.2 RUNNING SELF-TEST

Running the self-test program does not require any detailed knowledge of the printer switches, controls, indicators or operational procedures; this will be covered in later sections. Perform the printer self-test as follows:

a. Remove the printer window.

b. Locate (See Figure 2-1) the left and right tractors, and the tractor locking levers.

c. Carefully push the locking lever down on each tractor; slide each tractor to its outermost position.

d. Open the tractor doors (each is hinged on the outside edge) as far as they will go without moving the tractors.

> **NOTE**
>
> *If your printer has the semi-automatic single-sheet friction feed option installed, you must position the single-sheet friction feed/tractor feed mode select lever towards the front of the printer for this exercise. The lever is on the left side of the printer, under the window (see Figure 2-1). You must also slide the two friction rollers to the center of the printer, away from the tractors. See Appendix A for full details of the semi-automatic sheet feed option.*

e. Insert a sheet of pinfeed paper (9½ inch wide paper for the PRISM 80 or 14⅞ inch wide paper for the PRISM 132) into the paper loading slot at the back of the printer. [Figure 1-2 (PRISM 80) or Figure 1-3 (PRISM 132) shows the location of the slot.]

> **CAUTION**
>
> *Do not use narrower paper for self-test, as the print head will print off the paper, across the platen. Damage to the print head could occur if printing off the paper.*

f. Carefully push the paper up into the printer until it clears the print head.

g. Pull the paper up past the print head until you can position the paper pinfeed holes over the pins on the pinfeed belts in the tractors; you may have to move the tractors slightly to align the belts and paper.

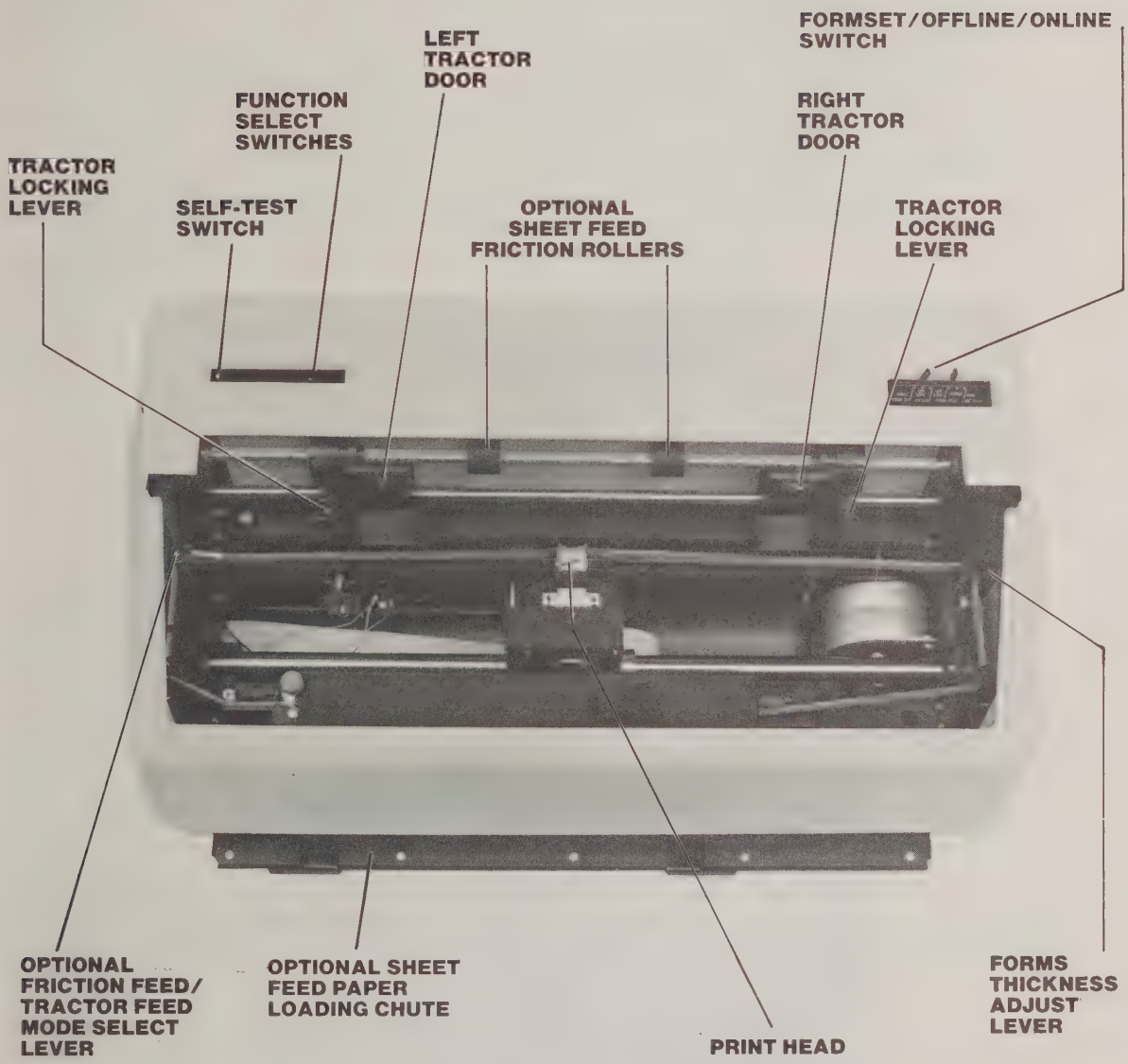
h. Carefully close the tractor doors: position the locking levers up to lock the tractors in place.

i. Set the following switches/controls (see Figure 2-1 for locations):

Switch/Control	***To***
Power ON/OFF Switch (back of printer)	OFF
FORMSET/OFFLINE/ONLINE Switch	OFFLINE
Self-Test Switch	Set to left

j. Ensure that the printer's line cord is plugged into a 3-wire grounded 115 Vac receptacle.

k. Position the power ON/OFF switch to ON; the PWR indicator will light and the print head will move to the left.



NOTE
THE PRISM 132 PRINTER IS SHOWN WITH SEMI-AUTOMATIC SINGLE SHEET FEED OPTION INSTALLED; THE PRISM 80 PRINTER IS SIMILAR, DIFFERING ONLY IN SIZE, WEIGHT AND CARRIAGE WIDTH.

Figure 2-1. Printer Controls

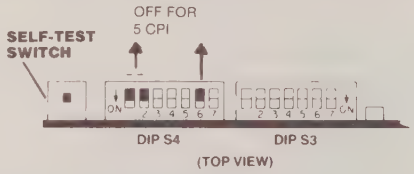
l. Position the Self-Test Switch to the right for several seconds. For as long as the switch is to the right (or until the paper runs out), the printer will print a repetitive test pattern of all printable characters. If the paper runs out, the printer will automatically stop printing and the FAULT indicator will light.

m. Position the Self-Test Switch to the left to stop the self-test printout. (The printer will continue printing for several lines before stopping.)

If you want to experiment, print 5 characters per inch by doing the following:

a. Position the power ON/OFF switch to OFF.

b. Look at Figure 2-1 and your printer to locate the function select switches and specifically, the two left most switches (1 and 2) next to the Self-Test Switch and switch 6 (see below).



FUNCTION SELECT SWITCHES

c. Using a ball-point pen or something similar (but not a pencil), position the three function select switches towards the back of the printer.

d. Position the power ON/OFF switch to ON; the print head will move to the left.

e. Position the Self-Test Switch to the right for several seconds; the printer will print the test pattern at 5 characters per inch.

f. Position the Self-Test Switch to the left to stop self-test.

g. Position the power ON/OFF switch to OFF.

h. Reinstall the window.

This completes the self-test checkout of the printer.

2.3 CONFIGURING FOR 230 VAC POWER

If your power source is 230 Vac, and the printer was not configured for this, you can reconfigure the printer for 230 Vac operation. This is accomplished through a 115/230 Vac power select switch located on the power supply circuit board, under the printer's cover (see Figure 2-2). To select 230 Vac, proceed as follows:

> **WARNING**
>
> *Ensure that the ac line power cord has been unplugged from the power source before proceeding with this procedure.*

a. Check that the ac line power cord is unplugged.

b. Carefully slide the printer forward to the edge of the table or stand so that you have access to the underside of the two front corners.

c. Using a Phillips screwdriver, remove the two Phillips screws (one at the underside of each corner) holding the cover to the printer.

d. Turn the printer so that you have access to the underside of the two back corners.

e. Remove the two Phillips screws (one at each corner) holding the cover to the printer.

f. Carefully lift the cover from the printer.

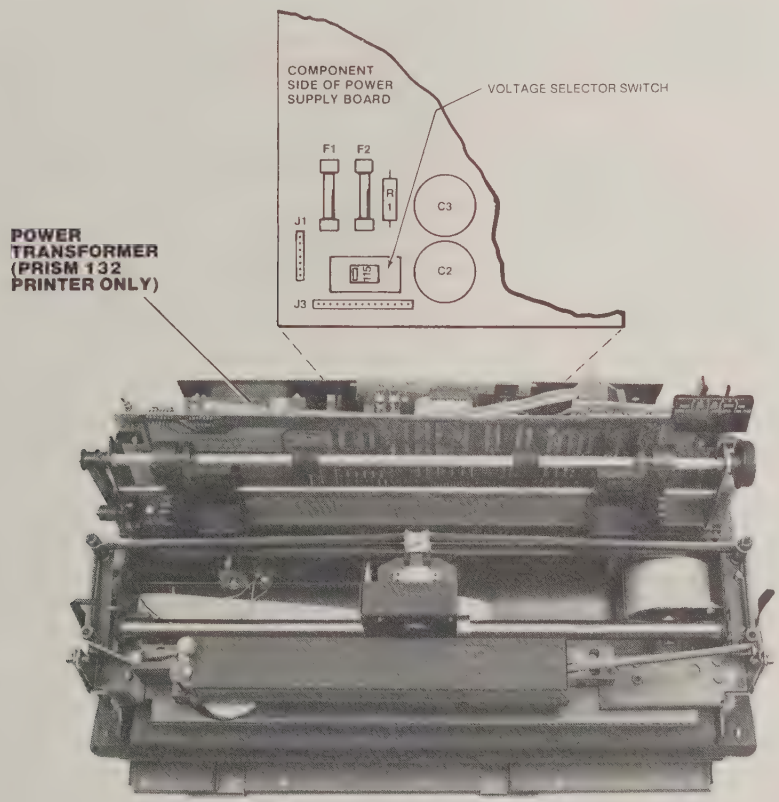
g. Locate the power supply board and the power select switch (see Figure 2-2).

h. To select 230 Vac, slide the power select switch away from the transformer for the PRISM 132 printer or towards the transformer for the PRISM 80 (use an offset screwdriver to position the switch).

i. To select 115 Vac, slide the power select switch towards the transformer for the PRISM 132 printer or away from the transformer for the PRISM 80 printer.

j. Reinstall the cover; insert and tighten the four Phillips screws (one at each corner) holding the cover to the printer chassis.

k. Restore power to the printer.



NOTE
THE PRISM 132 PRINTER IS SHOWN; THE PRISM 80 PRINTER IS SIMILAR EXCEPT THAT THE POWER TRANSFORMER IS TO THE RIGHT OF THE POWER SUPPLY CIRCUIT BOARD.

Figure 2-2. 115/230 Vac Power Selection

SECTION 3
CONNECTING TO YOUR COMPUTER

The information in this section will guide you in installing and connecting the printer to your computer. We explain what is needed, offer suggestions for selecting the proper interface and interface cable, describe how to connect the interface cable, and what to do to reconfigure the printer for serial or parallel operation. If you want to construct an interface cable, we have provided information that will help you do so.

You will normally be concerned only with paragraphs 3.1 through 3.3: What's Needed, Selecting the Interface and Interface Cable, and Connecting the Interface Cable. The remaining paragraphs explain unique applications and configurations and are referenced as appropriate.

3.1 WHAT'S NEEDED

To connect the printer to the computer you will need the following:

- Computer I/O interface board (parallel or serial).
- Computer-to-printer parallel or serial interface cable.

Since so many manufacturers of computer interface cables exist, we do not supply them as standard items with the printer. However, we do stock several interface cables as accessory items; they may be purchased from your IDS dealer. Or, if you prefer, make your own interface cable with the information given in paragraph 3.5.

3.2 SELECTING THE INTERFACE AND INTERFACE CABLE

Selection of a parallel or serial interface and interface cable is largely dependent on your computer as the printer will accept either parallel or serial data. You should first determine if your computer already has an interface installed or if one must be installed. If already installed, you must see if it is parallel, serial or dual-mode (can be configured for either parallel or serial). If the interface is not installed, you must obtain and install the appropriate interface as recommended by the computer manufacturer.

When selecting an interface and if your computer will accept either a parallel or serial interface, keep in mind the following. Generally, the parallel interface is used if the printer will be installed within 10 feet of the computer; the parallel interface allows faster transmission of data. If you will be installing the printer more than 10 feet from the computer or if you expect to use a telephone modem then use the serial interface.

Once you have determined your interface installation, you can select an interface cable compatible with the computer interface and the printer. The printer will accept a parallel interface cable or a standard RS-232-C serial interface cable. Your dealer can help you in choosing the correct cable or refer to your computer manual and/or interface manual for guidance. If you want to make your own cable, refer to paragraph 3.5 in this section.

3.3 CONNECTING THE INTERFACE CABLE

With your parallel or serial interface installed in the computer and the parallel or serial interface cable connected to the interface, you are ready to connect the other end of the cable to the printer.

However, before connecting the cable to the printer, determine:

a. Is the printer configured for parallel or serial operation?

b. Is the polarity of the parallel interface signals from the computer matched with those in the printer?

The printer was shipped from the factory configured for parallel operation; if you elected to go serial, the printer can easily be reconfigured for serial operation (see paragraph 3.4.1 for serial configuration procedures).

For polarities, note that the printer was shipped from the factory with the printer's BUSY signal active when high and the data STROBE signal active on the rising edge. Many computers are compatible with this arrangement; however, some computers may require that one or both signals be inverted. Check your computer and/or interface manual to see which polarity is required. If you need to invert polarities, see paragraph 3.4.3 in this section for inverting procedures.

Either way, parallel or serial, once you have accomplished the above, connect the interface cable to the interface connector at the back of the printer, on the lower left side. Match the cable connector to the printer connector, then carefully push the connector in until it is firmly seated; screw the connector in place to prevent it from coming loose.

3.4 CONFIGURING THE PRINTER FOR SERIAL/PARALLEL OPERATION

The printer is shipped configured for parallel operation, with the BUSY signal active on high and the data STROBE signal active on the rising edge. If you require serial operation or you need to invert the BUSY and/or STROBE signals, you must reconfigure the printer's interface strapping. This is explained in the following paragraphs.

3.4.1 CONFIGURING FOR A SERIAL INTERFACE

To configure the printer for serial operation requires the removal of a jumper from the strapping platform on the controller circuit board, under the printer cover. This is accomplished as follows:

a. Turn the printer off and unplug the ac line power cord.

b. If installed, disconnect the interface cable from the interface connector at the back of the printer.

c. Remove any paper loaded in the printer.

d. Carefully slide the printer forward to the edge of the table or stand so that you can get at the underside of the printer's two front corners.

e. Using a Phillips screwdriver, remove the two Phillips screws (one at each corner) at the underside of the front corners.

f. Turn the printer so that you can get at the underside of the two back corners.

g. Using a Phillips screwdriver, remove the two Phillips screws (one at each corner) at the underside of the back corners.

h. Carefully lift the cover up and off the printer.

i. Locate the strapping platform on the left side (when looking at the back of the printer) of the controller circuit board; the platform is next to interface connector J1 on the circuit board.

j. Disconnect the connector cable from J1 on the board.

k. Using Figure 3-1 as a reference, locate and remove the jumper from position 7-8; the other jumpers may stay in place. Tweezers or needle nose pliers may be helpful in removing the jumper. Tape the jumper inside the printer in case you want to reconfigure the interface at a later date.

l. Reconnect the connector cable to J1 on the board; be sure that the connector is firmly seated.

m. Reinstall the cover; insert and tighten the four Phillips screws (one at each corner) holding the cover to the printer chassis.

n. Restore power to the printer.

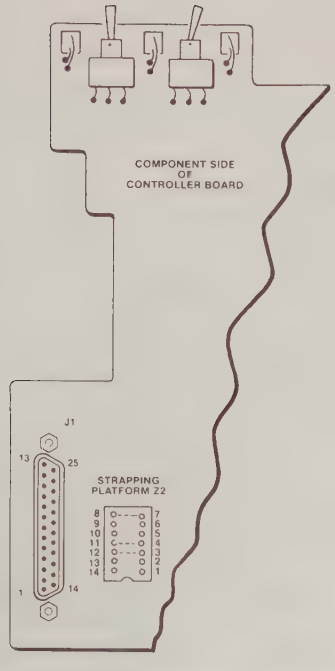


Figure 3-1. Strapping Platform

3.4.2 CONFIGURING FOR A PARALLEL INTERFACE

To configure the printer for parallel operation requires the insertion of a jumper into the strapping platform on the controller circuit board. This is accomplished as follows:

a. Turn the printer off and unplug the ac line power cord.

b. Remove the printer cover and locate the strapping platform per steps b. through j. in paragraph 3.4.1.

c. Using Figure 3-1 as a reference, locate position 7-8 on the strapping platform and insert a jumper across position 7-8.

d. Reinstall the cover; insert and tighten the four Phillips screws holding the cover to the chassis.

e. Restore power to the printer.

3.4.3 INVERTING THE BUSY AND/OR DATA STROBE SIGNALS

Some applications may require that the BUSY and/or data STROBE signals be inverted. To do this requires relocating several jumpers on the strapping platform. This is accomplished as follows:

a. Turn the printer off and unplug the ac line power cord.

b. Remove the printer cover and locate the strapping platform per steps b. through j. in paragraph 3.4.1.

c. Invert the BUSY signal by moving the jumper from position 4-11 to position 5-10 (see Figure 3-1).

d. Invert the data STROBE signal by moving the jumper from position 3-12 to position 2-13 (see Figure 3-1).

e. Reinstall the cover; insert and tighten the four Phillips screws holding the cover to the chassis.

f. Restore power to the printer.

3.5 MAKING YOUR OWN INTERFACE CABLE

We do not include the interface cable as a standard item with the printer but we do offer several cables as accessory items that may be purchased from your IDS dealer. Or, you may wish to make your own interface cable; if so, the following information may be helpful.

3.5.1 PARALLEL INTERFACE CABLING

Figure 3-2 shows the cabling connections required for a parallel interface.

> **NOTE**
>
> *Check your computer and/or interface manual to see what connections you need; you may not need all we show in Figure 3-2.*

During normal operation, the computer monitors the BUSY signal from the printer. When BUSY is low, indicating the printer is ready to accept data, the computer places a 7-bit ASCII character on the data lines and strobes the printer's STROBE line (see Figure 3-3). On the positive edge of the STROBE signal, the printer raises the BUSY signal to indicate it is no longer ready to receive another character. BUSY will stay high until the printer is ready to accept the next character. At this time, the BUSY signal will go low, and a negative going pulse will appear on the Acknowledge line. The following data strobe rising edge must not occur sooner than five microseconds after BUSY has gone low.

> **NOTE**
>
> *The BUSY and STROBE signals, as shipped from the factory, operate as shown in Figure 3-3. For some applications, it may be necessary to invert one or both of these signals (see paragraph 3.4.3 for details).*

Four additional status signals (ONLINE, FAULT, ENABLED, PAPER OUT) are also present at the parallel interface to indicate the printer's operational status to the computer. ONLINE remains high while the printer is online. FAULT is forced low when the printer is offline, out of paper, or if a memory error was detected during power-up. ENABLED is high if the remote control select feature has not deselected the printer. This signal goes high upon receiving a DC1 (XON) control character and goes low upon receiving a DC3 (XOFF) control character. PAPER OUT is high whenever the printer is out of paper.

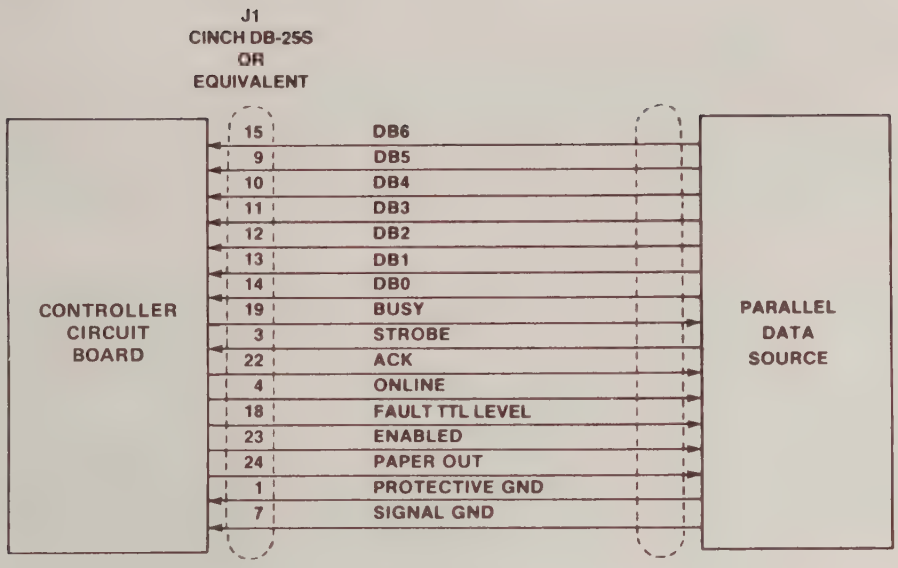
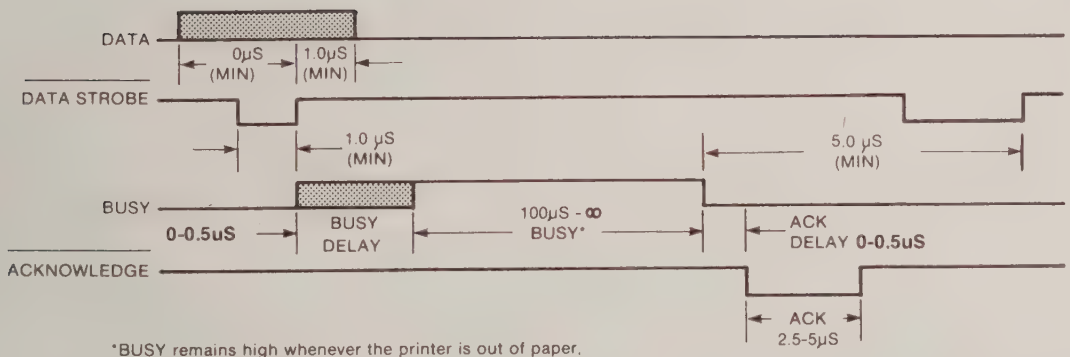


Figure 3-2. Parallel Interface



*BUSY remains high whenever the printer is out of paper, is offline, or has a full buffer

NOTE
TIMING SHOWN REFLECTS THE SIGNAL STRAPPING AS SHIPPED FROM THE FACTORY (SEE FIGURE 3-1).

Figure 3-3. Parallel Interface Timing

3.5.2 SERIAL INTERFACE CABLING

Figure 3-4 shows the cabling connections for a serial EIA RS-232C interface. It is normally configured with the printer as the DTE (Data Terminal Equipment) source, accepting serial data from the DCE (Data Communications Equipment) source. The printer uses Data Terminal Ready (DTR) to control the flow of received data to prevent data overflow conditions. This is accomplished by dropping DTR whenever the printer data buffer is nearly filled, temporarily inhibiting Received Data flow until the buffer is able to accept additional data.

The printer interface uses the XMT (transmit) DATA line to send Control-Q (XON) to the computer when its receive buffers are able to accept Received Data. Conversely, it sends Control-S (XOFF) to temporarily inhibit data flow.

The FAULT signal is forced low (-10 volts) whenever the printer is out of paper or if an error condition is detected; the signal goes high (+10 volts) if there are no error conditions.

In some installations it may be necessary to interface the printer to a computer that is configured as a DTE rather than DCE (see Figure 3-5). In such a configuration interface signals DTR, Received Data, and Send Data are rerouted in a "cross-over" cable. These signal crossovers cause the printer to appear as a DCE, sending signal Data Set Ready (DSR) to the DTE data source to regulate transmit data.

NOTE

Some installations will not require Transmit Data, Protective Ground, and Fault signals. The printer frame and logic ground are tied directly to the third prong (ac protective ground lead) on the ac plug.

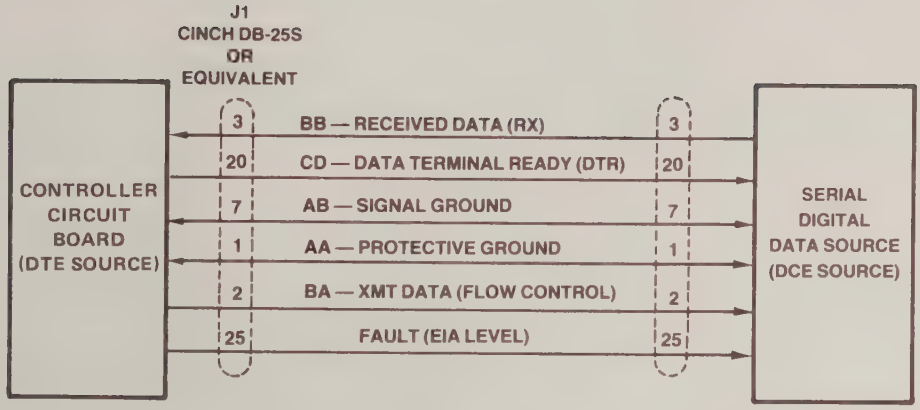


Figure 3-4. Serial EIA Interface, Printer to DCE Data Source

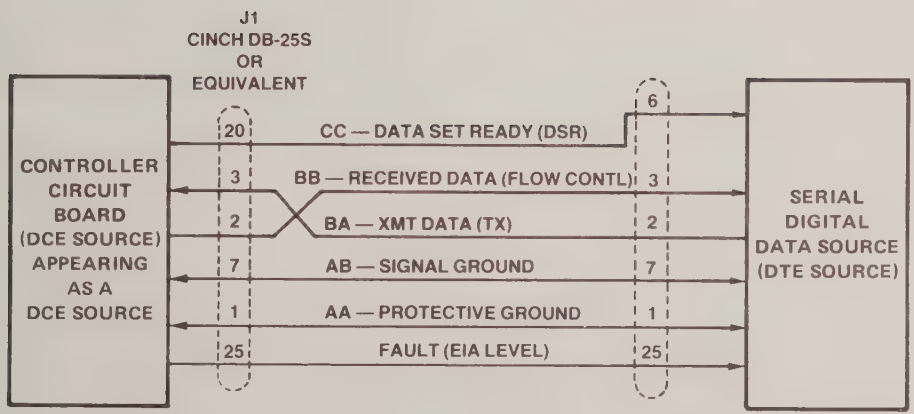


Figure 3-5. Serial EIA Interface, Printer to DTE Data Source

SECTION 4
OPERATOR CONTROLS, INDICATORS AND FUNCTION SELECT SWITCHES

The information in this section will fully acquaint you with the functions and locations of the printer's controls, indicators, and function select switches. We recommend that you become familiar with this section before continuing on to the operational sections of the manual.

4.1 CONTROLS AND INDICATORS

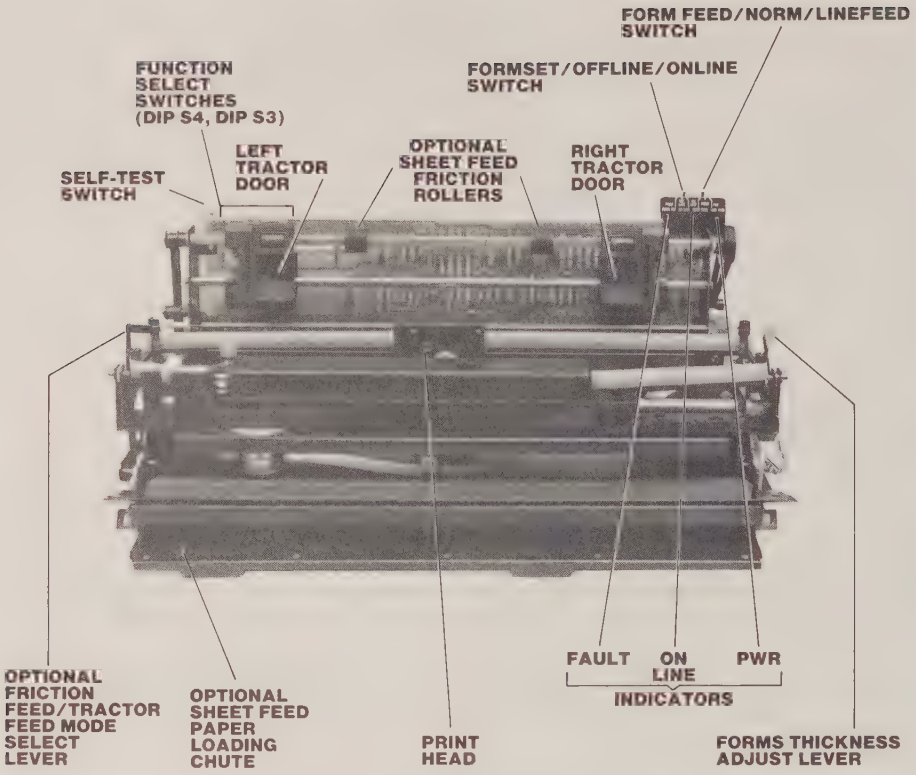
Table 4-1 lists and describes all operator controls and indicators; Figure 4-1 shows the location of each. To help you become familiar with the controls and indicators, we suggest that you operate the printer per the exercise in paragraph 4.3

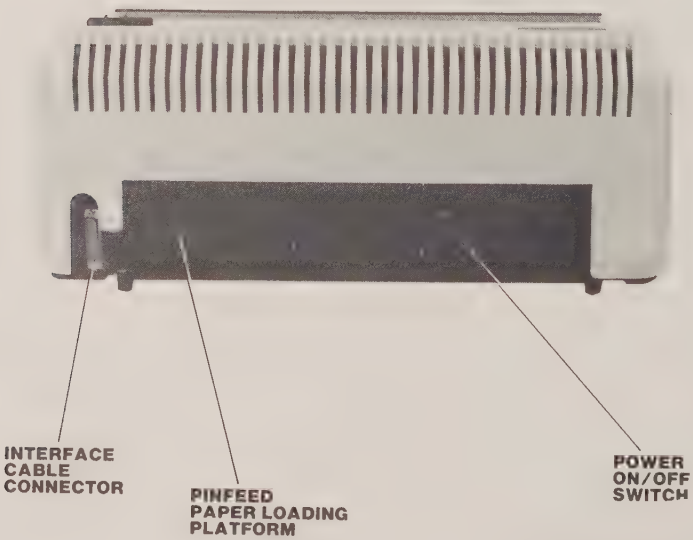
4.2 FUNCTION SELECT SWITCHES

The printer has two DIP (dual in-line) packages (DIP S3 and DIP S4) that each contain seven function select switches for manually setting many of the printer functions. Table 4-2 lists and describes the function of each switch; note that several of these functions can also be set by ASCII control codes or programming, as discussed in Section 6. Figure 4-2 shows the location of each switch and identifies how the switch should be positioned (*On* or *Off*) to select a particular function. We suggest that you operate the printer per the exercise in paragraph 4.3 to see how the function select switches operate.

As shown in Figure 4-1, the switches are accessible through an opening in the top left of the printer's cover, allowing easy setting while preventing accidental resetting. Each switch has an *On* and *Off* position, and each is positioned with a narrow, blunt object such as a ball-point pen (but not a lead pencil as carbon in the pencil is conductive).

An important point to remember about setting the function select switches is that all switches must be set *BEFORE* turning the printer on. If you want to change a setting, you must *ALWAYS* turn the printer off, reset the switch(es), and then turn the printer on. Otherwise the printer will not acknowledge the new settings. If you happen to change switch settings when the printer is on, it will not damage anything, but the settings will not be acknowledged.





NOTE
THE PRISM 132 PRINTER IS SHOWN WITH SEMI-AUTOMATIC SHEET FEED AND COLOR OPTIONS INSTALLED; THE PRISM 80 PRINTER IS SIMILAR, DIFFERING ONLY IN SIZE, WEIGHT AND CARRIAGE WIDTH.

Figure 4-1. Operator Controls and Indicators

Table 4-1
Controls and Indicators

Control/Indicator	Function
ON/OFF AC Power Switch	Turns the printer on or off.
FORMSET/OFFLINE/ONLINE Three-Position Switch	ONLINE position allows the printer to receive and print data. OFFLINE position causes the printer to stop printing (incoming data may still be placed in the buffer, if not full), and enables the FORM FEED/LINE FEED and Self-Test switches. FORMSET position, when used with the FORM FEED/LINE FEED switch, allows paper positioning.
FORM FEED/NORM/LINE FEED Momentary Contact Spring-Return-To-Center Switch (NORM position is the Spring-Return-To-Center off position of the switch).	Vertically positions paper as follows: 1. With the FORMSET/OFFLINE/ONLINE switch at OFFLINE, a. Momentarily positioning the FORM FEED/LINE FEED switch to FORM FEED will advance paper to the last top-of-form setting. b. Momentarily positioning the FORM FEED/LINE FEED switch to LINE FEED will advance the paper one line. c. Holding the FORM FEED/LINE FEED switch at LINE FEED causes the paper to be continuously line fed. 2. With the FORMSET/OFFLINE/ONLINE switch at FORMSET, a. Holding the FORM FEED/LINE FEED switch at FORM FEED will slowly advance the paper downward in 1/48 inch increments. b. Holding the FORM FEED/LINE FEED switch at LINE FEED will slowly advance the paper upward in 1/48 inch increments.
Self-Test Two-Position Switch	Enabled only when the FORMSET/OFFLINE/ONLINE switch is at OFFLINE, then: 1. Momentarily positioning the Self-Test Switch to the right, then back to the left, clears the printer buffer. 2. Positioning the Self-Test Switch to the right clears the printer buffer and causes a repetitive test pattern of the 96 ASCII printable character set to be printed out for a visual check of print quality. Test pattern will be printed for as long as the Self-Test Switch is at the right (and for several lines after the switch is positioned back to the left position).
Function Select Switches DIP S3 and DIP S4	Two DIP switch packages with seven function select switches each for selecting various printer functions (see Table 4-2 for detailed descriptions).
PWR (Power) On Indicator	Lights when ac power is switched ON at the printer.
ONLINE Indicator	Lights when the printer is switched ONLINE. Flashes on and off, along with the FAULT indicator, if a random access memory error is detected when the printer is switched on.
FAULT Indicator	Lights when the printer is out of paper. Flashes on and off, along with the ONLINE indicator, if a random access memory error is detected when the printer is switched on.
Forms Thickness Adjust Lever	Moves the print head towards or away from the paper to compensate for different thicknesses of paper.

Table 4-2
Function Select Switches

Function Select DIP S4		Function Select DIP 3	
SW1 & SW2*	Selects a character print density of 5 (double width), 10, 12, or 16.8 cpi.	SW1, SW2 & SW3*	Selects one of eight available paper or form lengths from 3 to 14 inches (76.2 to 355.6 mm).
SW3*	Selects line spacing at either 6 or 8 lines per inch.	SW4 & SW5	Selects serial data baud rate of incoming serial digital data as 300, 1200, 2400, or 9600 baud.
SW4	Enables or disables automatic 1-inch skip at form boundaries. (Skip is programmable; see Section 6.)	SW6 & SW7	Defines parity checking functions for data characters received in serial mode.
SW5	Enables or disables an automatic line feed upon receiving a CR (carriage return) control character.		
SW6	Enables switches SW1 and SW2 of DIP S4.		
SW7	Enables or disables expanded software control functions. (See Section 6.)		*Switch settings which may be redefined via software control codes.

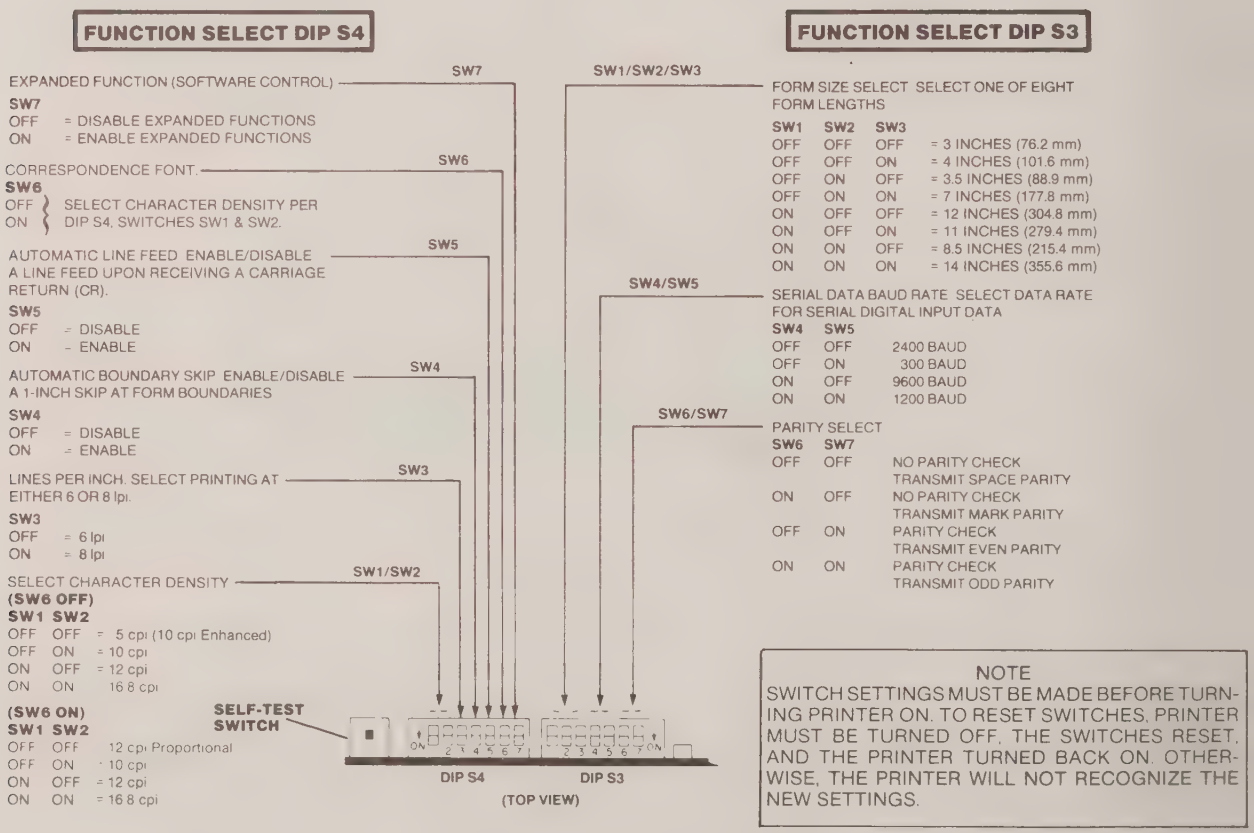

FUNCTION SELECT DIP S4
EXPANDED FUNCTION (SOFTWARE CONTROL)
SW7
SW7
OFF = DISABLE EXPANDED FUNCTIONS
ON = ENABLE EXPANDED FUNCTIONS
CORRESPONDENCE FONT.
SW6
SW6
OFF
ON
SELECT CHARACTER DENSITY PER DIP S4. SWITCHES SW1 & SW2.
AUTOMATIC LINE FEED ENABLE/DISABLE A LINE FEED UPON RECEIVING A CARRIAGE RETURN (CR).
SW5
SW5
OFF = DISABLE
ON = ENABLE
AUTOMATIC BOUNDARY SKIP ENABLE/DISABLE A 1-INCH SKIP AT FORM BOUNDARIES
SW4
SW4
OFF = DISABLE
ON = ENABLE
LINES PER INCH. SELECT PRINTING AT EITHER 6 OR 8 lpi.
SW3
SW3
OFF = 6 lpi
ON = 8 lpi
SELECT CHARACTER DENSITY
SW1/SW2
(SW6 OFF)
SW1 SW2
OFF OFF = 5 cpi (10 cpi Enhanced)
OFF ON = 10 cpi
ON OFF = 12 cpi
ON ON = 16.8 cpi
(SW6 ON)
SW1 SW2
OFF OFF 12 cpi Proportional
OFF ON 10 cpi
ON OFF = 12 cpi
ON ON = 16.8 cpi
SELF-TEST SWITCH
DIP S4
DIP S3
(TOP VIEW)
FUNCTION SELECT DIP S3
SW1/SW2/SW3
FORM SIZE SELECT SELECT ONE OF EIGHT FORM LENGTHS
SW1 SW2 SW3
OFF OFF OFF = 3 INCHES (76.2 mm)
OFF OFF ON = 4 INCHES (101.6 mm)
OFF ON OFF = 3.5 INCHES (88.9 mm)
OFF ON ON = 7 INCHES (177.8 mm)
ON OFF OFF = 12 INCHES (304.8 mm)
ON OFF ON = 11 INCHES (279.4 mm)
ON ON OFF = 8.5 INCHES (215.4 mm)
ON ON ON = 14 INCHES (355.6 mm)
SW4/SW5
SERIAL DATA BAUD RATE SELECT DATA RATE FOR SERIAL DIGITAL INPUT DATA
SW4 SW5
OFF OFF 2400 BAUD
OFF ON 300 BAUD
ON OFF 9600 BAUD
ON ON 1200 BAUD
SW6/SW7
PARITY SELECT
SW6 SW7
OFF OFF NO PARITY CHECK TRANSMIT SPACE PARITY
ON OFF NO PARITY CHECK TRANSMIT MARK PARITY
OFF ON PARITY CHECK TRANSMIT EVEN PARITY
ON ON PARITY CHECK TRANSMIT ODD PARITY
NOTE
SWITCH SETTINGS MUST BE MADE BEFORE TURNING PRINTER ON. TO RESET SWITCHES, PRINTER MUST BE TURNED OFF, THE SWITCHES RESET, AND THE PRINTER TURNED BACK ON. OTHERWISE, THE PRINTER WILL NOT RECOGNIZE THE NEW SETTINGS.

Figure 4-2. Function Select Switches

4.3 EXERCISING THE CONTROLS AND FUNCTION SELECT SWITCHES

The following exercise will show you how the controls and function select switches operate. For simplicity, the exercise is run without your computer and uses the printer's self-test feature. However, the controls and switches used in the exercise operate in the same manner and produce the same results with your computer. Perform the exercise as follows:

a. Remove the printer window.

b. Locate (see Figure 4-1) the left and right tractors, and the tractor locking levers.

c. Carefully push down the locking lever on each tractor; slide each tractor to its outermost position.

d. Open the tractor doors as far as they will go without moving the tractors.

> **NOTE**
>
> *If your printer has the semi-automatic single-sheet friction feed option, you must position the friction feed/tractor feed mode select lever towards the front of the printer. You must also slide the two friction rollers to the center of the tractor drive rail. See Appendix A for details on the semi-automatic sheet feed option.*

e. Insert a sheet of pinfeed paper (9½ inch wide paper for the PRISM 80 or 14⅞ inch wide paper for the PRISM 132) into the paper loading slot at the back of the printer.

> **CAUTION**
>
> *Do not use narrower paper for self-test as the print head will print off the paper, across the platen. Damage to the print head could occur if printing off the paper.*

f. Push the paper up into the printer until it clears the print head.

g. Pull the paper up past the print head until you can position the paper pinfeed holes over the pins on the pinfeed belts in the tractor; you may have to move the tractors slightly to align the belts and paper.

h. Carefully close the tractor doors; position the locking levers up to lock the tractors in place.

i. Set the following controls and function select switches:

Switch/Control	***To***
Power ON/OFF Switch	OFF
FORMSET/OFFLINE/ONLINE Switch	OFFLINE
Self-Test Switch	Set to Left
Function Select Switches	For this exercise, set the switches for 16.8 characters per inch and 8 lines per inch. Locate DIP S4 (see Figure 4-2) and set function select switches SW1, SW2 and SW3 to their *On* positions. The other function select switches can be left as is.

j. Ensure that the printer's line cord is plugged into a 3-wire grounded 115 Vac receptacle.

k. Position the power ON/OFF switch to ON; the PWR indicator will light and the print head will move to the left.

l. Exercise the various paper positioning functions through the FORMSET/OFFLINE/ONLINE and FORM FEED/LINE FEED switches. To do this, go to Table 4-1 and set the two switches as outlined under the Function column for the FORM FEED/LINE FEED switch.

m. Set the FORMSET/OFFLINE/ONLINE switch to OFFLINE.

n. Run a test pattern by setting the Self-Test Switch to the right for several seconds, then back to the left. The test pattern will be printed at 16.8 characters per inch and at 8 lines per inch.

o. Now change the characters per inch to 5 and the number of lines per inch to 6:

   1. Position the power ON/OFF switch to OFF.

   2. Position function select switches SW1, SW2, SW3 and SW6 of DIP S4 to their *Off* positions (see Figure 4-2).

> **NOTE**
>
> *Remember, when setting the function select switches, you must ALWAYS turn the printer off, set the switches, then turn the printer back on.*

p. Position the power ON/OFF switch to ON; the PWR indicator will light.

q. Run a test pattern by setting the Self-Test Switch to the right for several seconds, then back to the left position. The test pattern will be printed at 5 characters per inch and at 6 lines per inch.

r. Position the power ON/OFF switch to OFF.

s. Reinstall the printer window.

At this point you should be familiar with the operation of the switches and controls and ready to go on to the operational sections.

SECTION 5
PRINTING WITH PINFEED PAPER

This section explains how to operate the printer with the function select switches and pinfeed paper. Included are procedures for loading paper, adjusting the print head for different paper thicknesses, manually setting paper margins, and manually setting top-of-form positions. Section 6 discusses printer operation with control codes and programming.

5.1 POWER UP AND OPERATION

The printer is powered up and operated as follows:

a. Check that the printer is properly connected to your computer (see Section 3).

b. Initially set the printer controls and switches as follows:

Switch/Control	***To***
Power ON/OFF Switch	OFF
FORMSET/OFFLINE/ONLINE Switch	OFFLINE
Self-Test Switch	Set to the left
Function Select Switches (DIP S3 and DIP S4)	Set per Table 4-2 and Figure 4-2. If you are operating in serial mode, be sure to set the proper baud rate (DIP S3, switches SW4 and SW5).

NOTE

If your printer has the semi-automatic single sheet friction feed option installed, you must position the single-sheet friction feed/tractor feed mode select lever towards the front of the printer. You must also slide the two friction rollers to the center of the rail, away from the tractors. See Appendix A for full details of the semi-automatic sheet friction feed option.

c. Ensure that the printer line cord is plugged into a 3-wire grounded ac power receptacle.

d. Position the power ON/OFF switch to ON; the PWR indicator will light, and the print head will move to the left.

NOTE

If paper has not been loaded into the printer or the printer runs out of paper, the FAULT indicator will light and stay lit until paper is loaded.

e. For initial operation and thereafter on an as-required basis:
   1. Load pinfeed paper and adjust the print head per paragraph 5.2.
   2. Manually adjust the paper margins per paragraph 5.3 (the margins can also be programmed, see Section 6).
   3. Manually set the top-of-form position per paragraph 5.4 (the top-of-form position can also be programmed, see Section 6).

f. Position the FORMSET/OFFLINE/ONLINE switch to ONLINE; the ONLINE indicator will light.

> **NOTE**
>
> *If the ONLINE and FAULT indicators are both flashing, the diagnostics are indicating a random access memory error. If these indications occur, refer to Section 8 for corrective action.*

g. The printer is now ready to receive and print data on pinfeed paper in accordance with the previously set function select switch settings.

5.2 LOADING PINFEED PAPER

Pinfeed paper is loaded into the printer as follows:

a. Check that the power ON/OFF switch is at ON and that the FORMSET/OFFLINE/ONLINE switch is at OFFLINE.

> **NOTE**
>
> *Always switch the printer to OFFLINE when loading paper, to ensure that the print head does not unexpectedly start printing.*

b. Momentarily position the FORM FEED/LINE FEED switch to FORM FEED to clear the print line registers.

c. Remove the printer window and open the tractor doors.

d. Place a supply of pinfeed paper at the back of or underneath the printer; ensure that the paper path is unobstructed.

> **NOTE**
>
> *The printer uses standard single-part pinfeed fanfold paper (15 to 20 lb.) or up to six-part forms (12 to 15 lb. paper and 6 or 8 lb. carbons) The PRISM 80 Printer uses paper or forms with a width ranging from 5.0 inches minimum up to 9.5 inches maximum (including perforations). The PRISM 132 Printer uses paper or forms with a width ranging from 5.0 inches minimum up to 14 7/8 inches maximum (including perforations).*

e. Insert the top edge of the paper into the paper loading slot at the back or bottom of the printer, as shown in Figure 5-1.

f. Carefully push the pinfeed paper upward through the printer until you can pull it past the print head and up to the tractors.

g. Position the paper pinfeed holes over the pins on the pin belts, and close the tractor doors.

> **NOTE**
>
> *It may be necessary to adjust the tractors to the width of the paper being loaded. To adjust, pull down the locking lever on each tractor, slide the tractors horizontally to the required paper width, insert the paper, and lock the tractors in place.*

h. Momentarily position the Self-Test Switch to the right to run a test pattern, then:
   1. Check the margins and manually adjust as necessary (see paragraph 5.3).
   2. Check the print quality. If the print is too light, move the print head closer to the paper; if too dark or smudging, move the print head away from the paper. Adjust the print head by moving the Forms Thickness Adjust Lever towards the front of the printer to move the head back or move the lever towards the back of the printer to move the head forward.

> **NOTE**
>
> *If the print continues to be light, the ribbon may need replacement. Ribbon replacement procedures are included in Section 7.*

i. If necessary, adjust the top-of-form position per paragraph 5.4.

j. Reinstall the printer window.

k. Position the FORMSET/OFFLINE/ONLINE switch to ONLINE to resume printing.

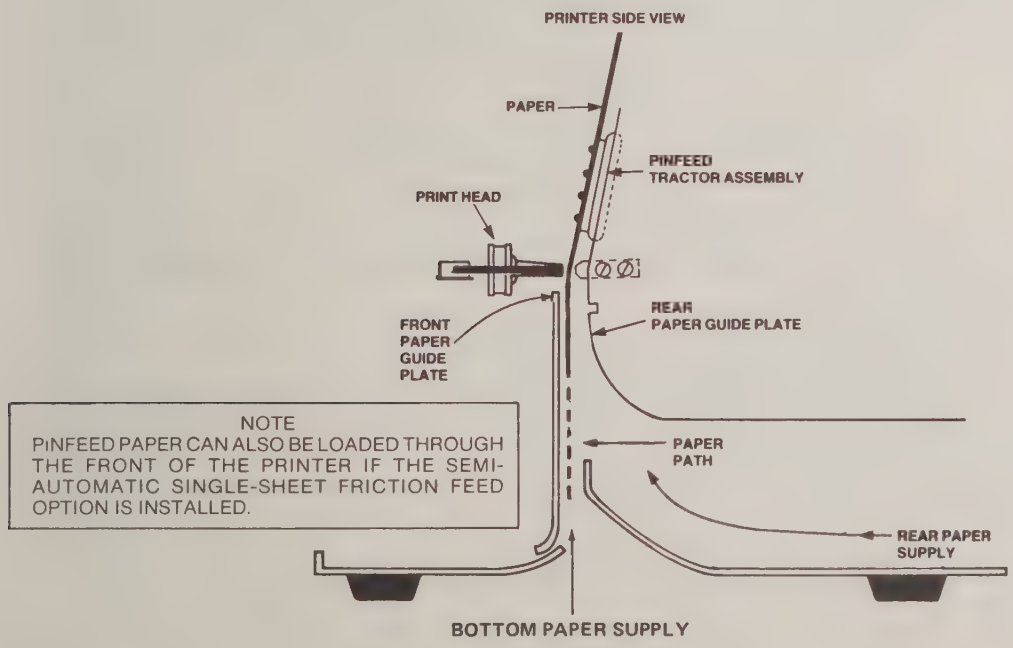

PRINTER SIDE VIEW
PAPER
PINFEED TRACTOR ASSEMBLY
PRINT HEAD
REAR PAPER GUIDE PLATE
FRONT PAPER GUIDE PLATE
NOTE
PINFEED PAPER CAN ALSO BE LOADED THROUGH THE FRONT OF THE PRINTER IF THE SEMI-AUTOMATIC SINGLE-SHEET FRICTION FEED OPTION IS INSTALLED.
PAPER PATH
REAR PAPER SUPPLY
BOTTOM PAPER SUPPLY

Figure 5-1. Pinfeed Paper Feed Path

5.3 MANUAL ADJUSTMENT OF PINFEED PAPER MARGINS

The left margin of the pinfeed paper can be adjusted by sliding the paper and both tractors to the left or right. The left and right margins can also be set through programming (see Section 6).

To manually set the left margin, proceed as follows:

a. Position the FORMSET/OFFLINE/ONLINE switch to OFFLINE.

b. Remove the printer window.

c. Unlock the tractors by pushing their locking levers down.

d. Slide the tractors and paper left or right to set the margin.

e. Lock the tractors in place.

f. Run a test pattern by momentarily positioning the Self-Test Switch to the right, then observing the test pattern for margin placement. If not correct, readjust the margins as necessary.

g. Reinstall the printer window.

h. Position the FORMSET/OFFLINE/ONLINE switch to ONLINE to resume printing.

5.4 MANUALLY SETTING THE TOP-OF-FORM POSITION

The top-of-form position is set after loading paper into the printer or to change a previously established top-of-form position. The top-of-form can also be set through programming (see Section 6). To manually set the top-of-form, proceed as follows:

a. Position the FORMSET/OFFLINE/ONLINE switch to OFFLINE.

b. Remove the printer window.

c. Initially align the top of the form being used with the top of the platen. This can be done by opening the tractor doors, taking the paper off the pin belts and manually moving the paper up or down to align the top with the platen. Position the paper on the pin belts and close the tractor doors.

d. Check that the function select switches (DIP S3, switches SW1, SW2, and SW3) are set for the desired form length; see Table 4-2 and Figure 4-2.

> **NOTE**
>
> *If the function select switch settings are to be changed, the power must be switched OFF, the switches reset, and power switched back ON.*

e. Momentarily position the FORM FEED/LINE FEED switch to FORM FEED; the paper will advance to the top of the next form.

f. If the form is not positioned as required, perform the following:
   1. Position the FORMSET/OFFLINE/ONLINE switch to FORMSET.
   2. Position the FORM FEED/LINE FEED switch to FORM FEED to move the paper down or to LINE FEED to move the paper up. Paper will initially step in increments of 1/48 inch, then will slowly slew after a short delay.
   3. When the desired top of form is reached, release the FORM FEED/LINE FEED switch.

g. Reinstall the printer window.

h. Position the FORMSET/OFFLINE/ONLINE switch to ONLINE to resume printing.

SECTION 6
PRINTING UNDER SOFTWARE CONTROL

Now that you have familiarized yourself with the operation of the printer while using the manually set function select switches and pinfeed paper, let's see what can be done through your computer.

You may recall from Section 1 that the printer recognizes the full ASCII character set and responds to certain ASCII control codes. We have summarized these in Table 6-1; the table also gives the binary, octal, decimal and hexadecimal equivalents of each. You have already seen that the printer prints the full 96 printable characters; now let's see what the control codes and programming can do.

The control codes will allow you to select several printer functions from your computer, rather than through the manually set function select switches. This eliminates turning off the printer, resetting the function select switches, and turning the printer back on every time you want to change functionality. The control codes also extend the printer's capabilities beyond what is available through the function select switches. For example, through use of the proper control codes, you can print text with even left and right margins and with proportional character spacing, producing text approaching book quality text.

The printer will also recognize certain programming that you can do from your computer. For example, you can program the printer to tab to a preselected position at a specific point in the program. The printer will then automatically tab to that position when commanded by the program.

These functions are identified and explained in the following paragraphs.

6.1 USING CONTROL CODES

The control codes that the printer will respond to are divided into two subsets (groups) as shown in Tables 6-2 and 6-3. Printer response to either subset is determined by the position of the Expanded Function select switch (DIP S4, switch SW7); Figure 4-2 in Section 4 shows the location of the switch.

If the Expanded Function select switch is in the *Off* position when the printer is turned on, the printer will respond only to the control codes in Table 6-2. If the Expanded Function switch is in the *On* position when the printer is turned on, then the printer will respond to the control codes in Table 6-3. Remember, if you want to change a function select switch setting, you must first turn the printer off, reset the switch(es), then turn the printer back on; otherwise the printer will not acknowledge the new settings.

Table 6-1
ASCII Character Set and Control Codes

ASCII Control Codes *(See Tables 6-2 and 6-3 for control code definitions)*

CHR	BINARY	OCT	DEC	HEX
NUL	00000000	000	000	00
SOH	00000001	001	001	01
STX	00000010	002	002	02
ETX	00000011	003	003	03
EOT	00000100	004	004	04
ENQ	00000101	005	005	05
ACK	00000110	006	006	06
BEL	00000111	007	007	07
BS	00001000	010	008	08
HT	00001001	011	009	09
LF	00001010	012	010	0A
VT	00001011	013	011	0B
FF	00001100	014	012	0C
CR	00001101	015	013	0D
SO	00001110	016	014	0E
SI	00001111	017	015	0F
DLE	00010000	020	016	10
DC1	00010001	021	017	11
DC2	00010010	022	018	12
DC3	00010011	023	019	13
DC4	00010100	024	020	14
NAK	00010101	025	021	15
SYN	00010110	026	022	16
ETB	00010111	027	023	17
CAN	00011000	030	024	18
EM	00011001	031	025	19
SUB	00011010	032	026	1A
ESC	00011011	033	027	1B
FS	00011100	034	028	1C
GS	00011101	035	029	1D
RS	00011110	036	030	1E
US	00011111	037	031	1F
SP	00100000	040	032	20
!	00100001	041	033	21
"	00100010	042	034	22
#	00100011	043	035	23
$	00100100	044	036	24
%	00100101	045	037	25
&	00100110	046	038	26
'	00100111	047	039	27
(	00101000	050	040	28
)	00101001	051	041	29
*	00101010	052	042	2A
+	00101011	053	043	2B
,	00101100	054	044	2C
–	00101101	055	045	2D
.	00101110	056	046	2E
/	00101111	057	047	2F
0	00110000	060	048	30
1	00110001	061	049	31
2	00110010	062	050	32
3	00110011	063	051	33
4	00110100	064	052	34
5	00110101	065	053	35
6	00110110	066	054	36
7	00110111	067	055	37
8	00111000	070	056	38
9	00111001	071	057	39
:	00111010	072	058	3A
;	00111011	073	059	3B
<	00111100	074	060	3C
=	00111101	075	061	3D
>	00111110	076	062	3E
?	00111111	077	063	3F
@	01000000	100	064	40
A	01000001	101	065	41
B	01000010	102	066	42
C	01000011	103	067	43
D	01000100	104	068	44
E	01000101	105	069	45
F	01000110	106	070	46
G	01000111	107	071	47
H	01001000	110	072	48
I	01001001	111	073	49
J	01001010	112	074	4A
K	01001011	113	075	4B
L	01001100	114	076	4C
M	01001101	115	077	4D
N	01001110	116	078	4E
O	01001111	117	079	4F
P	01010000	120	080	50
Q	01010001	121	081	51
R	01010010	122	082	52
S	01010011	123	083	53
T	01010100	124	084	54
U	01010101	125	085	55
V	01010110	126	086	56
W	01010111	127	087	57
X	01011000	130	088	58
Y	01011001	131	089	59
Z	01011010	132	090	5A
[	01011011	133	091	5B
\	01011100	134	092	5C
]	01011101	135	093	5D
^	01011110	136	094	5E
_	01011111	137	095	5F
`	01100000	140	096	60
a	01100001	141	097	61
b	01100010	142	098	62
c	01100011	143	099	63
d	01100100	144	100	64
e	01100101	145	101	65
f	01100110	146	102	66
g	01100111	147	103	67
h	01101000	150	104	68
i	01101001	151	105	69
j	01101010	152	106	6A
k	01101011	153	107	6B
l	01101100	154	108	6C
m	01101101	155	109	6D
n	01101110	156	110	6E
o	01101111	157	111	6F
p	01110000	160	112	70
q	01110001	161	113	71
r	01110010	162	114	72
s	01110011	163	115	73
t	01110100	164	116	74
u	01110101	165	117	75
v	01110110	166	118	76
w	01110111	167	119	77
x	01111000	170	120	78
y	01111001	171	121	79
z	01111010	172	122	7A
{	01111011	173	123	7B
|	01111100	174	124	7C
}	01111101	175	125	7D
~	01111110	176	126	7E
⊞	01111111	177	127	7F

Table 6-2
Subset 1 Control Codes
(Expanded Function DIP S4 Switch SW7 *Off*)

Printer Function	Keyboard Control Code	ASCII Control Code	Decimal Code	Hexa-decimal Code	Function Description
Line Feed	CTRL-J	LF	10	OA	Causes printer to print data in buffer, then advances paper one line and does a carriage return.
Form Feed	CTRL-L	FF	12	OC	Causes printer to print data in buffer then slews paper to next top-of-form position.
Carriage Return	CTRL-M	CR	13	OD	Causes printer to print data in buffer, then performs a carriage return to the beginning of same line if function select DIP S4 switch SW5 (automatic line feed) was *Off* when printer powered-up. If function select DIP S4 switch SW5 was *On* when printer powered-up, a linefeed will also be performed.

Table 6-3
Subset 2 Control Codes
(Expanded Function DIP S4 Switch SW7 *On*)

Printer Function	Keyboard Control Code	ASCII Control Code	Decimal Code	Hexa-decimal Code	Function Description
Printer					
Select	CTRL-Q	DC1	17	11	Causes printer to receive and print data from computer.
Deselect	CRTL-S	DC3	19	13	Causes printer to ignore data from computer until CTRL-Q is received.
Print Mode					
Normal	CTRL-B	STX	02	02	Causes printer to print characters normal (not expanded) width.
Expanded	CTRL-A	SOH	01	01	Causes printer to print characters double width (not normal).
Print Density					
10 cpi	CTRL-]	GS	29	1D	Causes printer to print 10 cpi.
12 cpi	CTRL-↑	RS	30	1E	Causes printer to print 12 cpi.
16.8 cpi	CTRL-_	US	31	1F	Causes printer to print 16.8 cpi.
Character Spacing					
Fixed	CTRL-F	ACK	06	06	Causes printer to print characters with fixed space between each.
Proportional	CTRL-P	DLE	16	10	Causes printer to automatically print characters with inter-character proportional spacing to improve text appearance. Using this function with the JUSTIFY function creates printed text approaching book quality text.

Table 6-3
Subset 2 Control Codes (Cont'd.)
(Expanded Function DIP S4 Switch SW7 *On*)

Printer Function	Keyboard Control Code	ASCII Control Code	Decimal Code	Hexa-decimal Code	Function Description
Justify					
On	CTRL-D	EOT	04	04	Causes printer to automatically adjust the length of a printed line so that left and right margins are even. When using JUSTIFY, you must send all text as a single line without carriage returns or line feeds; the printer will break this text at word boundaries to form justified lines. **NOTE** *Some computer interfaces automatically send a carriage return at the end of each line and therefore cannot justify text. If this is the case, you can override this by using a Control Z; see NEW LINE, below.* You must terminate each paragraph with a carriage return; this tells the printer to push any remaining text in the last line to the left margin and not spread it across the last line. The JUSTIFY function can also be used with the EXPANDED, FIXED, or PROPORTIONAL functions.
Off	CTRL-E	ENQ	05	05	Causes printer to stop text justification.
NEW LINE	CTRL-Z	SUB	26	1A	For those computers that automatically send a carriage return at the end of each line and inhibit text justification, use of Control Z will allow text justification when in JUSTIFY mode. This can be done by sending a Control Z at the end of every line. If using Control Z, the carriage return and line feed codes should be reassigned; the carriage return code should be changed to Control Z and the linefeed code should be changed to Null. This causes text to be justified on a word wrap basis. At the end of a paragraph, you should change Control Z and Null back to carriage return and line feed, respectively; then send a carriage return to cause the last line of the paragraph to be pushed to the left margin and not spread across the last line.
Tabs					
Horizontal	CTRL-I	HT	09	09	Causes printer to tab to next set horizontal tab position; if tab not set or programmed, printer ignores control code.
Vertical	CTRL-K	VT	11	0B	Causes printer to slew paper to next set vertical tab position; if tab not set or programmed, printer will ignore control code.

Table 6-3
Subset 2 Control Codes (Cont'd.)
(Expanded Function DIP S4 Switch SW7 *On*)

Printer Function	Keyboard Control Code	ASCII Control Code	Decimal Code	Hexa-decimal Code	Function Description
Vertical Advance					
ADV-1 w/o CR	CTRL-R	DC2	18	12	Causes printer to move paper the amount specified by vertical advance-1 but without a carriage return.
ADV-1 and CR	CTRL-J	LF	10	OA	Causes printer to move paper the amount specified by vertical advance-1 with a carriage return.
ADV-2 w/o CR	CTRL-T	DC4	20	14	Causes printer to move paper the amount specified by vertical advance-2 but without a carriage return. (Printer defaults to subscript.)
ADV-2 and CR	CTRL-N	SO	14	OE	Causes printer to move paper the amount specified by vertical advance-2 and with a carriage return. (Printer defaults to subscript.)
ADV-3 w/o CR	CTRL-Y	EM	25	19	Causes printer to move paper the amount specified by vertical advance-3 but without a carriage return. (Printer defaults to superscript.)
Carriage Return	CTRL-M	CR	13	OD	Causes printer to print data in buffer, then performs a carriage return to the beginning of the same line, if function select DIP S4 switch SW5 (automatic line feed) was *Off* when printer powered up. If function select DIP S4 switch SW5 was *On* at printer turn-on, a vertical advance-1 (linefeed) will also be performed.
Line Feed	CTRL-J	LF	10	OA	Causes printer to move paper the amount specified by vertical advance-1.
Form Feed	CTRL-L	FF	12	OC	Causes printer to slew paper to next top-of-form position.
Program-ming	CTRL-[	ESC	27	1B	Causes printer to recognize certain programming commands (see paragraph 6.2).
Optional Graphics Mode	CTRL-C	ETX	03	03	Causes printer to enter graphics mode if Graphics Mode Option installed.
Back Space	CTRL-H	BS	08	08	Causes printer to back space one mono-spaced character equal to the selected density.If in the *Proportional* mode, the backspace is one *Monospaced* character width of the selected density. Note that the left margin position may not be exceeded when backspacing.

6.2 PROGRAMMING THE PRINTER

The printer will accept certain programming commands from your computer that will extend the printer's usefulness and your control over it. By using the appropriate command, you can program:

- Three separate up or down vertical paper movements
- Left and right margins
- Forms length
- Up to eight horizontal tab positions
- Up to eight vertical tab positions
- Intercharacter spacing
- Absolute positioning of paper and next printable character
- Absolute line and character positioning
- Relative horizontal positioning of the next printable character

Table 6-4 lists the programmable functions and their parameters. Note that the expanded function switch (DIP S4, switch SW7) must be in its *On* position before the printer will acknowledge programming, and that you must use the programming escape code (see Table 6-3) each time you program a function.

> **NOTE**
>
> *Before programming, check your interface manual to see how to set the interface for programming the printer.*

The programming command format is basically the same for all commands used to program the printer. It consists of:

Escape Code, Command Character, Argument 1 . . . N, Terminator

where		
	Escape Code	= Program Escape Code from Table 6-3
	Command Character	= Command Character from Table 6-4
	Argument 1 . . . N	= The Argument Value from Table 6-4
	Terminator	= Any non-numeric character (except comma or space) such as a $

You must also use separators, either spaces or commas, between arguments. No separator is required between the escape code and command character.

For example, if you wanted to program the printer for horizontal tab settings at 1, 2, 3, 4, and 5 inches from the left most printable position, a BASIC command might look like this:

```
10 PRINT CHR$ (27); "F, 120,240,360, 480, 600, $"
```

where		
	(27)	= Program Escape Code from Table 6-3
	F	= Command Character from Table 6-4 for Setting Horizontal Tabs
	Separator	= Comma or space
	120	= Argument Value from Table 6-4 for Setting Horizontal Tab times the Horizontal Tab to be set (120 increments per inch x 1 inch = 120 Argument Value).
	240	= Argument Value from Table 6-4 for Setting Horizontal Tab to be set (120 increments per inch x 2 inches = 240 Argument Value).
	360	= Same as above, except setting tab at 3 inches (120 increments per inch x 3 inches = 360 Argument Value).
	480	= Same as above, except setting tab at 4 inches (120 increments per inch x 4 inches = 480 Argument Value).
	600	= Same as above, except setting tab at 5 inches (120 increments per inch x 5 inches = 600 Argument Value).
	$	= Command Terminator

The $ character was selected because it will show in listings. It will not normally be printed since it is part of the command string.

If the printer finds a problem within a command line, the part of the command not processed due to the error will be printed. For instance, if the ASCII escape code was garbled, the printer would print:

F, 120, 240, 360, 600, $

since it did not consider this data part of a valid command sequence.

The following paragraphs explain each programmable function, and give representative BASIC commands for each. Figure 6-1 at the end of this section is a sample program using many of these programmable functions. The program was run through an Apple Computer and printed out on a PRISM Printer™ to produce the print sample shown in Figure 6-2. After you have become familiar with this section you may wish to run the program through your computer and printer.

Table 6-4
Programmable Functions and Parameters
(Expanded Function DIP S4 Switch SW7 On)

Programmable Function	Command Character	No. of Arguments Available	Argument Value	Default Values
Vertical ADV-1	B	1	1/48 inch	If lines per inch function select switch is set to 6 lpi, default = 8 units (8/48 inch). If lines per inch function select switch is set to 8 lpi, default = 6 units (6/48 inch).
Vertical ADV-2	C	1	1/48 inch	4 units (4/48 inch forward movement).
Vertical ADV-3	D	1	1/48 inch	-4 units (4/48 inch reverse movement).
Vertical Tabs	E	Up to 8	1/48 inch	0 units
Horizontal Tabs	F	Up to 8	1/120 inch	0 units
Absolute Horizontal Position of Next Printable Character	G	1	1/120 inch	0 units
Absolute Vertical Position of Paper	H	1	1/48 inch	0 units
Left/Right Margins	J	2	1/120 inch	0,1584 (PRISM 132). 0,960 (PRISM 80).
Form Length	L	2	1/48 inch	Per function switch setting.
Absolute Line	M	1	—	0 units
Horizontal Character Position	N	1	—	0 units
Intercharacter Spacing Increment	P	1	1/24 char. width	0 units
Optional Color Selection	Q	5	1 thru 5	Defaults to black color band.
Character Set Selection	R	Up to 16 with Sprint Mode ™ Option	16 with Sprint Mode™ Option	
Relative Horizontal Positioning	U	1	± 1/120 inch	0 units

6.2.1 VERTICAL ADVANCE PROGRAMMING

Three separate vertical paper advances, either positive (up) or negative (down), may be programmed: vertical advance 1 (ADV-1), vertical advance 2 (ADV-2) and vertical advance 3 (ADV-3). When programmed, the printer will move the paper up or down in 1/48 inch increments. The printer will not move the paper down past the top of the current form; for example, if the printer had just received a top-of-form command and a vertical advance 3 command was sent, no paper motion would occur.

Vertical advance 1 (ADV-1) is used whenever a line feed code (ASCII LF) is sent to the printer. ADV-1 is set according to the number of lines per inch selected by the lines per inch function select switch (DIP S4, switch SW3) at printer turn-on. Vertical advance 2 is defaulted to a value of 4 (4/48 inch); this is equivalent to a subscript. Vertical advance 3 defaults to a value of -4 (-4/48 inch); this is equivalent to a superscript. After the superscript is printed, a vertical advance 2 will return the paper to the base line. Superscripts will look better if paper is moved past the destination then back to take out tractor/paper "slop".

The BASIC programming command format is the same for each vertical advance. For example, if you wanted to program the printer so that vertical advance 1 provides linefeeds of one inch, the BASIC command might look like this:

```
10 PRINT CHR$ (27); "B, 48, $"
```

where (27) = Program Escape Code from Table 6-3
B = Command Character from Table 6-4 for Setting Vertical Advance 1
48 = Argument Value from Table 6-4 times the Linefeed Value (48 increments per inch x 1 inch =48 Argument Value)
$ = Command Terminator

The other advances can be programmed by substituting the appropriate command character from Table 6-4 for the B command character and the desired advance.

Reverse paper advances (back toward the top of the page) are sent as negative numbers (precede each with a minus sign). For example, a BASIC command might look like this:

```
10 PRINT CHR$ (27); "D,-4,$"
```

Once programmed, the advances may be tested by sending the appropriate control code for that function: i.e., CHR$ (10) (a linefeed) for advance 1; CHR$ (14) (an ASCII SO character) for advance 2; and CHR$ (25) (an ASCII EM character) for advance 3.

6.2.2 LEFT AND RIGHT MARGINS PROGRAMMING

The left and right margins can be programmed in 1/120 inch increments relative to the left most printable position. Both the left and right margins can be programmed by the same BASIC command line. For example, if you wanted to set the left margin one inch from the left most printable position and the right margin five inches from the left most printable position to yield a print line of four inches, the command might be:

```
10 PRINT CHR$ (27); "J, 120, 600, $"
```

The first argument (120) sets the left margin, the second (600) sets the right. If only the left margin is to be adjusted, only one argument need be given. Care should be taken to ensure that the margins are set prior to setting horizontal tabs. Note that the left and right margins must be at least 1-1/120 inch apart.

When the printer is first turned on, the margin settings default to 0, 1584 (13.2 inches) for the PRISM 132 or 0,960 (8.0 inches) for the PRISM 80. The zero represents the left-most printable position and 1584 (or 960) corresponds to the right-most printable position.

6.2.3 FORM LENGTH PROGRAMMING

Form lengths can be programmed to nearly any practical length using a BASIC command. For example, if you wanted to set the physical size of the form to eight inches and the printable space to seven inches, the BASIC command might look like this:

```
10 PRINT CHR$ (27); "L, 384, 336, $"
```

where (27) = Program Escape Code from Table 6-3
L = Command Character from Table 6-4
384 = Argument Value from Table 6-4 times the Form Size (48 increments per inch x 8 inches = 384).
336 = Argument Value from Table 6-4 times the Printable Space (48 Increments per inch x 7 inches = 336).
$ = Terminator

The second argument must always be less than the first or the command will be ignored; this allows skip space for the printer when the automatic form skip is enabled. If the second argument is set equal to the first, the automatic form skip is disabled. If only the first argument is sent, the form skip defaults to 0 length (unless set by the auto skip DIP switch).

6.2.4 VERTICAL AND HORIZONTAL TAB PROGRAMMING

Up to eight vertical and horizontal tabs may be programmed. Vertical tabs are measured in 1/48 inch units, and horizontal tabs in 1/120 inch units. When programming tabs, you must send the settings in ascending numeric order. Any setting which is less than the previous value will be ignored. Previously set tabs will be automatically cleared when a new tab set command is received. Tab settings are relative to the left-most print position horizontally, and top of form vertically. The command line for setting horizontal and vertical tabs is identical except for the command letter (see Table 6-4). A typical BASIC command might look like this:

```
10 PRINT CHR$ (27); "E, 48, 240, 288, 336, $"    Sets vertical tabs at 1, 5, 6 and 7 inches.
10 PRINT CHR$ (27); "F, 120, 240, 360, $"        Sets horizontal tabs at 1, 2 and 3 inches.
```

The printer will move the paper to the next vertical tab position (measured from the top of the current form) upon receipt of a VT [CHR$ (11)] command and position the head to the next horizontal tab position when a HT [CHR$ (9)] is received. If no tabs are set, these codes will be ignored.

NOTE

You should ensure that the right margin is set before setting tabs or, if this is not the case, then the right margin should be set to a value greater than the left-most tab value. Similar precautions should be used for vertical tab and form size settings. Also, keep in mind that the printer will default to a 0 tab setting whenever the printer is turned off and back on.

Tabs may be cleared by setting a single tab to 0. For example:

```
10 PRINT CHR$ (27); "E, O, $"    Clears vertical tab.
10 PRINT CHR$ (27); "F, O, $"    Clears horizontal tab.
```

If tabs are set two or more times, only the most recent setting is recognized. All previously entered tab settings are discarded.

6.2.5 INTERCHARACTER SPACING PROGRAMMING

The amount of space between characters can be programmed by using a BASIC command. Spacing is measured in 1/24 character width increments for 10 cpi, and 1/25 character width increments for 12 and 16.8 cpi. The spacing increments for the different densities are as follows:

Density	*Increments (inches/mm)*
10 cpi	0.00417/0.106
12 cpi	0.00347/0.0882
16.8 cpi	0.00248/0.0630

A nominal character width is determined by the current character density. For instance, 10 characters per inch gives 1/240 inch increments in fixed spacing. The following BASIC command sequence will increase character spacing by 1/2 a character width:

```
10 PRINT CHR$ (27); "P, 12, $"
```

> **NOTE**
>
> *This command should be used only when the printer is in the fixed spacing mode. Unpredictable or erratic spacing may occur if it is used with proportional spacing.*

6.2.6 ABSOLUTE POSITIONING OF PAPER AND NEXT PRINTABLE CHARACTER

Through programming, the next printable character and the paper can be positioned to a position relative to the left most printable position and top-of-form, respectively. The next printable character is set in 1/120 inch horizontal increments; the paper is positioned in 1/48 inch vertical increments up or down.

For example, if you wanted to print the next printable character six inches from the left most printable position and at a point three inches from the top of the current form, the BASIC commands might look like the following:

```
10 PRINT CHR$ (27); "G, 720, $"
```
Print next printable character six inches from the left most printable position.

```
10 PRINT CHR$ (27); "H, 144, $"
```
Move the paper to three inches below the top-of-form.

These commands are effective bi-directionally; i.e., they will execute the required motion from any point on the line or form, reverse feeding paper as necessary; however, the printer will not move the paper down past the top of the current form. Care should be taken to make sure that paper so moved does not bind or jam.

6.2.7 ABSOLUTE LINE AND CHARACTER POSITIONING

This command allows random access to any line or character position on a given form. The command sequence is:

```
10 PRINT CHR$ (27); "M, 17, $"
```
Move paper to the 17th line in the current form using current line spacing.

```
10 PRINT CHR$ (27); "N, 35, $"
```
Move the head to the 35th character position on the line, based on the current print density (characters per inch).

When counting characters or lines, remember that the left most character of a line is character 0 and that the top line of a form is line 0.

NOTE

If the printer is in the expanded character mode (double width characters), keep in mind that each expanded character occupies two normal width character positions.

The command can be used to provide a fixed amount of indentation for proportionally spaced text or to index to any character position printed with fixed spacing. Proportionally spaced characters are positioned according to the character widths, and so cannot be indexed accurately with this command.

Like the absolute positioning command described above, paper will be reverse fed if required to move it to the new position. Care should be taken to see that it does not bind or jam under these conditions.

6.2.8 RELATIVE HORIZONTAL POSITIONING OF NEXT PRINTABLE CHARACTER

This command allows positioning of the next printable character in 1/120 inch horizontal increments relative to the current printed character, either left or right. This would allow you, for example, to overlay colors if you have the color option installed. A typical BASIC command to print the next printable character one 1/120 inch increment to the right of the current printed character might look like this:

```
10 PRINT $ (27); "U, 1, $"
```

where (27) = Program Escape Code from Table 6-3
U = Command Character from Table 6-4
1 = Number of 1/120 inch Increments (in this example, 1 increment to the right)
$ = Command Terminator

If you wanted to print the next printable character one 1/120 inch increment to the left of the current character, the BASIC command might look like this:

```
10 PRINT $ (27); "U, -1, $"
```

Note that if the command exceeds either the left or right most printable position, the next printable character will be positioned at the left-most printable position. Also, the left margin position must not be exceeded when back spacing.

```
5  PR# 1
15  REM  SET MARGINS
20  PRINT  CHR$ (27);"J,120,960,$"
25  REM  SELECT ENHANCED MODE, 16.8 CPI
30  PRINT  CHR$ (1); CHR$ (31);
33  PRINT  TAB( 5);
35  PRINT "THIS PRINT SAMPLE WAS RUN ON THE PRISM PRINTER"
40  PRINT : PRINT  CHR$ (2); CHR$ (29): REM  NORMAL MODE, 10 CPI
45  PRINT  CHR$ (27);"J,240,840": REM  RESET MARGIN FOR TEXT
50  PRINT  CHR$ (4); CHR$ (16): REM  SELECT PROPORTIONAL SPACING, ADJUST
MODE
55  PRINT "This text is being printed on the IDS Prism printer using the";
57  PRINT " justify mode, proportional spacing and a character pitch density of 10
cpi."
60  PRINT : PRINT
70  PRINT "The margin has been set to about 5 inches to show";
80  PRINT " the combined features. No carriage returns or line feeds are sent";
90  PRINT " when text is justified, since the printer manages line lengths";
100  PRINT " automatically."
110  PRINT
120  PRINT  CHR$ (27);"J,420,660,$": REM  MARGINS TO ABOUT 2 INCHES
130  PRINT "Now the margins are set to about 2 inches in width.";
140  PRINT " Be sure to notice that justification is still in effect and both";
150  PRINT " the right and left margins are still straight."
160  PRINT  CHR$ (6);: REM  SELECT FIXED SPACING
170  PRINT  CHR$ (27);"J,240,840,$": REM  MARGINS BACK TO ORIGINAL SIZE
180  PRINT
190  PRINT "This paragraph is printed using the fixed spacing mode. Justification
has been left";
200  PRINT " on to show its effect on character spacing. Now we will";
210  PRINT " switch to 12 characters per inch density,";
220  PRINT " proportional spacing."
225  PRINT : PRINT
230  PRINT  CHR$ (30); CHR$ (16);: REM  SELECT 12 CPI, PROPORTIONAL SPACING
235  PRINT "While we are at it, here is an example of";
240  PRINT  CHR$ (1);" 12 CPI ENHANCED ";
250  PRINT  CHR$ (2);: REM  NOIRMAL MODE
255  PRINT "printing.";
260  PRINT " This is a";
270  PRINT  CHR$ (20); CHR$ (31);: REM  VERTICAL ADV-2, SELECT 16.8 CPI
280  PRINT "subscript";
290  PRINT  CHR$ (25); CHR$ (25); CHR$ (20); CHR$ (30);
295  REM  THE ABOVE LINES DO 1/2 LINE FEEDS AND SELECT 12 CPI
300  PRINT " and a";
310  PRINT  CHR$ (25); CHR$ (31);: REM  VERTICAL ADV-3 AND 16.8 CPI
320  PRINT "superscript";
330  PRINT  CHR$ (20); CHR$ (30);: REM  VERTICAL ADV-2 AND 12 CPI
335  PRINT "printed with only two control codes.";
340  PRINT " A Vertical Advance 2 is used to move the paper down half a line";
350  PRINT " and a Vertical Advance 3 moves it up half a line."
360  PRINT : PRINT
370  PRINT "This demostration was produced to indicate some of the features of
the Prism printer."
380  PRINT : PRINT : PRINT
390  END
```

Figure 6-1. Sample Program

THIS PRINT SAMPLE WAS RUN ON THE PRISM PRINTER

This text is being printed on the IDS Prism printer using the justify mode, proportional spacing and a character pitch density of 10 cpi.

The margin has been set to about 5 inches to show the combined features. No carriage returns or line feeds are sent when text is justified, since the printer manages line lengths automatically.

Now the margins are set to about 2 inches in width. Be sure to notice that justification is still in effect and both the right and left margins are still straight.

This paragraph is printed using the fixed spacing mode. Justification has been left on to show its effect on character spacing. Now we will switch to 12 characters per inch density, proportional spacing.

While we are at it, here is an example of 12 CPI ENHANCED printing. This is a subscript and a superscript printed with only two control codes. A Vertical Advance 2 is used to move the paper down half a line and a Vertical Advance 3 moves it up half a line.

This demostration was produced to indicate some of the features of the Prism printer.

Figure 6-2. Print Sample Using Sample Program

SECTION 7
TAKING CARE OF YOUR PRINTER

The printer, while designed for minimum maintenance, does require occasional cleaning and ribbon cartridge replacement. The printer does not require any operator adjustments under normal operating conditions; the printer was factory adjusted and tested for optimum performance.

Printer cleaning and ribbon cartridge replacement are done on an as needed basis. The following procedures will guide you in cleaning the printer and replacing the ribbon cartridge.

7.1 CLEANING

The printer cover and internal areas are cleaned as follows:

a. Position the power ON/OFF switch to OFF and unplug the ac line cord from the power outlet.

b. Clean the cover with a mild detergent and a soft cloth. To remove ink or embedded stains, use a soft cloth moistened with isopropyl alcohol.

> **NOTE**
>
> *Do not use isopropyl alcohol to clean the printer window or the logo as it may cloud the surface. Be careful not to spill alcohol into the printer.*

c. To clean inside the printer, you must first remove the cover: loosen and remove the four screws (one at the underside of each corner) holding the cover to the printer, then carefully pull the cover straight up and off the printer.

d. Remove lint and other debris with a soft brush or lint free cloth; if care is taken, use a small vacuum cleaner.

e. If dust accumulations are heavy in the circuit board areas, blow the dust out.

f. When cleaning is completed, reinstall the cover, insert and tighten the four screws holding the cover to the printer, and restore power to the printer.

7.2 CHANGING THE RIBBON CARTRIDGE

Ribbon for the printer is supplied in a snap-in ribbon cartridge which allows fast, easy replacement. To replace the cartridge, proceed as follows:

> **NOTE**
>
> *Use only those ribbon cartridges supplied or approved by Integral Data Systems; these ribbons are readily available through your IDS dealer.*

a. Position the power ON/OFF switch to OFF.

b. Remove the printer window.

c. Center the print head and carriage on the carriage shaft; locate (see Figure 7-1) the ribbon carrier on the print head.

d. At the ribbon carrier, push the ribbon down to clear the curved arms, then pull the ribbon slightly forward and up to clear the carrier.

e. Pivot open the yoke assembly unit until you hear a click; a spring-loaded locking pin will snap-up to hold the yoke assembly open while changing the ribbon cartridge.

f. Depress the red ribbon cartridge latch (see Figure 7-1) to unlock the cartridge, then slide the cartridge to the right over the latch.

g. Lift the cartridge and ribbon from the printer and discard.

h. As necessary, clean the ribbon stuffing wheels, guide posts, ribbon rollers and the ribbon carrier with lint free tissue or "Q" tips moistened with isopropyl alcohol.

i. Unwrap a new cartridge; carefully pull the cardboard ribbon restrainer out of the stuffing (left) end of the cartridge.

j. Carefully pull approximately 10 inches of ribbon from the right end of the cartridge.

k. Place the cartridge on the ribbon cartridge base so that the right end of the cartridge is over the red latch.

l. Position the ribbon between the two stuffing wheels and around the yoke pivot ribbon guide.

m. Press down on the cartridge and slide the cartridge to the left until you hear a click; the cartridge is now locked in place.

n. Carefully position the ribbon between the stuffing wheels so that there are no folds or twists in the ribbon.

o. Push down on the yoke assembly locking pin to release the yoke assembly; this locks the ribbon in place between the stuffing wheels.

p. Starting at the yoke pivot ribbon guide, loop the ribbon around the ribbon guides and across the ribbon carrier (see Figure 7-1); if necessary, pull more ribbon from the right end of the cartridge.

q. At the ribbon carrier, slide the ribbon down between the nose of the carrier and the two ribbon carrier arms, then push the ribbon in and up between the curved arms.

r. Take up any slack in the ribbon by turning the slack take-up knob in the direction indicated by the arrow on the knob.

NOTE

Ensure that there are no twists in the ribbon at any point in the ribbon path.

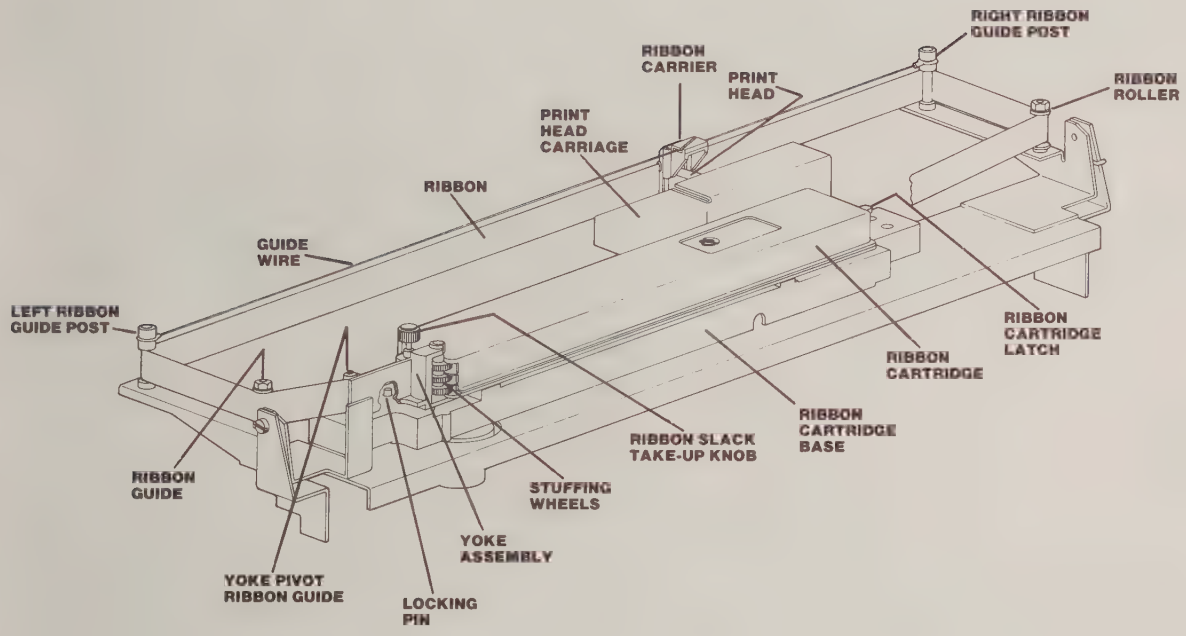
s. Recheck the ribbon to ensure that it is around all rollers and posts and is positioned under the curved arms of the ribbon carrier.

NOTE

Check that the guide wire is positioned within the slot in the top of the ribbon carrier; if it has slipped out, push it down into the slot.

t. Reinstall the printer window.

u. Position the power ON/OFF switch to ON.



NOTE
THE PRISM 132 PRINTER RIBBON GUIDE PATH IS SHOWN; THE PRISM 80 RIBBON GUIDE PATH IS SIMILAR BUT SHORTER IN LENGTH.

Figure 7-1. Ribbon Guide Path

SECTION 8
IF YOU HAVE PROBLEMS

There may be times when the printer will not operate properly, either through operator error or printer malfunction. To help you clear these problems and keep the printer operating, we have included in this section a listing of common problems and their possible causes. We have also included instructions for replacing blown fuses.

This section also contains a brief functional description of the printer's subsystems and photographs showing the locations of the subassemblies comprising the printers. Schematics and board assembly drawings for the printer are included in Appendix F.

8.1 TROUBLESHOOTING YOU CAN DO

Table 8-1 summarizes common problems that may occur in the printer. In some cases service will be required. Your local IDS representative can assist you in locating the authorized service center nearest you, or contact the Customer Support Group at IDS. The Customer Support Group has Service Technicians that can be reached between 8:00 a.m. and 5:00 p.m. EST on their toll-free Hot Line (1-800-258-1558). Service assistance over the phone is offered free of charge.

8.1.1 CHANGING FUSES

The printer contains two fuses: a 1.2 amp slow-blow fuse (F1) in the ac power line and a 3 amp fast-blow fuse (F2) in the 60 Vdc line. Both fuses are on the power supply circuit board, under the cover. To change the fuse(s), proceed as follows:

WARNING

Ensure that the ac line power cord has been disconnected from the power source before continuing with this procedure.

a. Ensure that the ac line cord is unplugged from the power outlet.

b. Loosen and remove the four Phillips screws (one at the underside of each corner) holding the cover to the printer; carefully lift the cover from the printer.

c. Locate (see Figure 2-2 in Section 2) the power supply circuit board and the two fuses on it.

d. Identify and replace the blown fuse(s) with an identically rated fuse.

CAUTION

If the fuse(s) continue to blow, turn off the printer and locate the cause. Do not replace the fuse more than once without finding the cause.

e. Reinstall the cover, and insert and tighten the four screws holding the cover to the printer chassis.

f. Restore power to the printer.

8.2 PRINTER FUNCTIONAL DESCRIPTION

The printer is functionally organized into three electromechanical subsystems: print, paper feed, and ribbon feed. Each subsystem is electronically controlled by a common microprocessor mounted on a controller circuit board and powered by a single power supply circuit board. All input/output signals are directed through the interface connector (J1) to the controller circuit board.

Each subsystem is briefly described in the following paragraphs. Figures 8-1 through 8-3 show the location of the assemblies comprising the PRISM 80 Printer; Figures 8-4 through 8-6 show the assemblies of the PRISM 132 Printer.

8.2.1 PRINT SUBSYSTEM

The print subsystem prints the data received from the data source. The subsystem basically consists of a print head and carriage assembly, carriage drive motor and drive belt, and an out-of-bounds sensor. The print head is a long-life, high reliability, ballistic type head that contains nine print wires. The wires are arranged in two vertical columns (five in one column and four in the second) to produce overlapping print dots. By selectively driving the wires against the ribbon and paper as the print head is moved across the printer, high density characters are formed on the paper.

The print head is mounted on a carriage which is driven bidirectionally by the carriage drive motor and drive belt. Both the print head and drive motor are controlled by the microprocessor on the controller circuit board.

The out-of-bounds sensor is at the left margin of the printer and, when activated by the print head as it returns to the left margin, signals the microprocessor that the print head has reached the left-most margin.

8.2.2 PAPER FEED SUBSYSTEM

The paper feed subsystem moves paper into position for printing and holds the paper stationary while printing. The subsystem basically consists of a tractor assembly, paper stepper motor and a paper out sensor. Pin feed paper is moved through the printer by pin belts in the tractor assembly; the pin belts are driven by a drive shaft, drive belt and the stepper motor.

The paper stepper motor, and thus paper movement, is controlled by microprocessor commands. The paper-out sensor signals the microprocessor to stop printing just before the paper runs out.

8.2.3 RIBBON FEED SUBSYSTEM

The ribbon feed subsystem drives the ribbon around the printer, between the paper and the print head, at a constant speed and in a fixed path. The subsystem basically consists of a ribbon cartridge, ribbon drive motor and ribbon feed path. The ribbon cartridge contains a continuous loop of pre-inked ¾ inch wide ribbon. The ribbon is driven by the motor through stuffing wheels. The ribbon feed path guides the ribbon from the cartridge around ribbon guides, across the platen, through a ribbon carrier on the print head carriage, through the stuffing wheels, and into the cartridge. A "skewed" ribbon path across the platen extends ribbon life by allowing the full width of the ribbon to be used.

8.2.4 CONTROLLER CIRCUIT BOARD

The printer is controlled by a Motorola MC6803 microprocessor and its peripheral interface and memory devices, all mounted on a single controller circuit board. The board accepts data from an external data source through the printer interface connector in the form of character codes, decodes that data, then outputs the data to the print subsystem for subsequent printout. Circuits on the board also control operation of the paper and ribbon feed subsystems, and control power and signal distribution within the printer. The board contains most of the operator controls, and all of the indicators and function select switches.

8.2.5 POWER SUPPLY CIRCUIT BOARD

The power supply circuit board supplies 5, 10 and 60 Vdc power to the controller circuit board, the carriage drive motor, and the paper drive motor. The board also contains the 115/230 Vac select switch, a 1.2 amp ac line fuse and a 3 amp fuse for the 60 Vdc line.

Table 8-1
Troubleshooting Hints

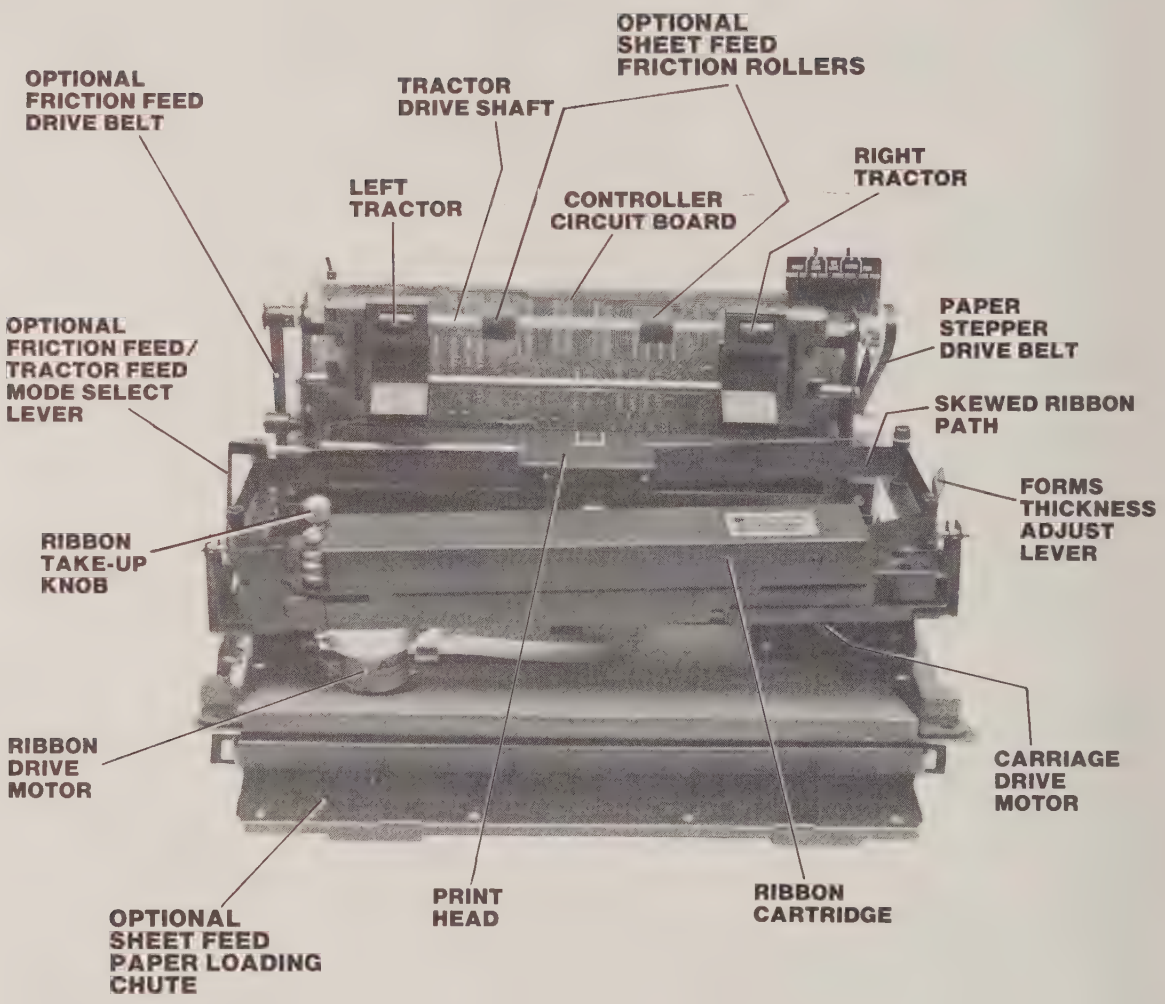
Problem	Possible Cause
Printer totally inoperative: PWR indicator remains off.	1. No AC power applied. 2. Line fuse blown. Replace with a 1.2 amp slow-blow fuse per procedures given in paragraph 8.1.1. **CAUTION** *If the fuse continues to blow, turn off the printer and locate the cause. Do not replace the fuse more than once without finding the cause.* 3. Power supply cable not connected to controller board. 4. Bad power supply board.
PWR indicator is on, head does not home: ONLINE and FAULT indicators are not flashing.	1. 60 volt fuse blown. Replace with 3 amp fast-blow fuse per procedures given in paragraph 8.1.1. **CAUTION** *If the fuse continues to blow, turn off the printer and locate the cause. Do not replace the fuse more than once without finding the cause.*
Printer operates in self-test mode but not in online mode.	1. Poorly seated or incorrectly wired interface cable. 2. Interface jumpers not set correctly. 3. Printer is software deselected. 4. Baud rate was set to wrong speed (as indicated by garbled print or "?"). 5. Parallel interface timing incorrect.
Printer loses or garbles characters in serial mode.	1. DTR or XON/XOFF codes not being honored by computer; this may be indicated by the printer printing approximately one-half of a screen of data before garbling. 2. Incorrect baud rate selected. 3. Noisy data line.
PWR indicator is on, both ONLINE and FAULT indicators are flashing.	1. Controller board memory error.
Printer loses or changes data in parallel mode.	1. Interface cable loose at the printer or interface. 2. Parallel interface timing incorrect. 3. Noise on the interface. 4. Parallel interface connector wired incorrectly or data lines shorted together.

Table 8-1
Troubleshooting Hints (Cont'd.)

Problem	Possible Cause
Printer prints question marks in parallel mode.	1. Parallel jumper not in place (see Section 3).
Printer becomes inoperative in use.	1. Out of paper (FAULT indicator will light). 2. Printer was software deselected. 3. Power loss (all indicators are out).
Printer always double spaces.	1. Auto line feed function select switch is *On*. 2. Vertical Advance-1 was programmed for extra space.
Printed lines are jammed together or overprinted.	1. Automatic line feed disabled and no line feed sent via software. 2. Vertical Advance-1 programmed for short line feeds. 3. Paper is snagged or out of tractors. 4. Paper motor pulley cracked or loose. 5. Tractors are binding. 6. Paper motor or controller board defective.
Ragged or uneven characters.	1. Head is too close to the paper; adjust Forms Thickness Adjust Lever. 2. Ribbon is worn out. 3. Carriage shaft is dirty. 4. Print head nose clamp loose. 5. Carriage worn. 6. Cracked front needle guide in head.
Printer prints question marks in serial mode.	1. Baud rate or parity of printer and interface not set to same values.
Printer does not print first character or characters missing.	1. Invalid escape sequence and first character of data was interpreted as terminator.
Faded or missing dots.	1. Head is too far back from paper; adjust Forms Thickness Adjust Lever. 2. Ribbon is worn out. 3. Ribbon is not threaded correctly. 4. Ribbon motor not running. 5. Bad print head or controller board.

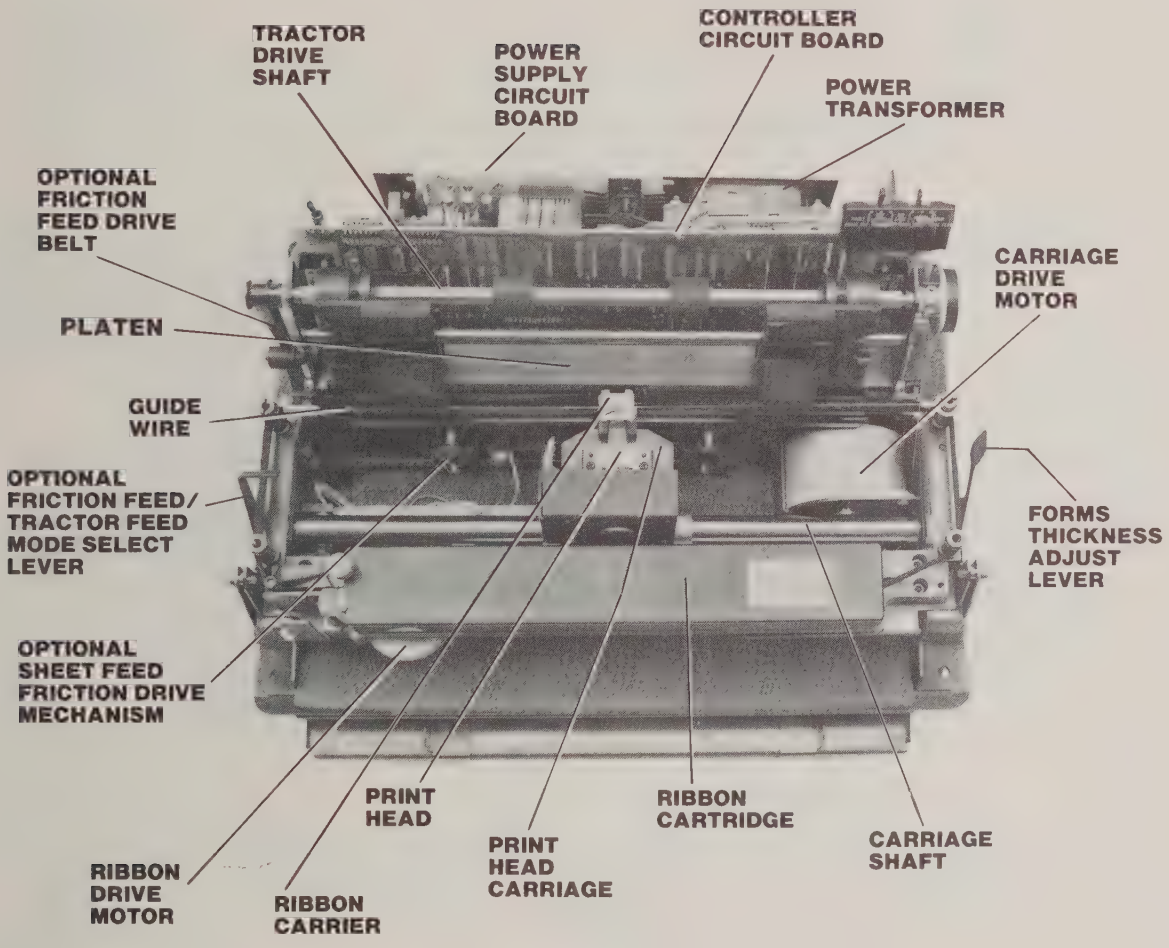
Table 8-1
Troubleshooting Hints (Cont'd.)

Problem	Possible Cause
Margins are uneven.	1. Print head too close to paper. 2. Carriage shaft is dirty. 3. Ribbon stuck on print head. 4. Lines being printed in proportional mode have leading spaces or carriage return at end of each line. 5. Carriage drive belt needs adjustment. 6. Loose carriage drive motor pulley. 7. Carriage drive motor bearings binding.
Printer skips about an inch every so often.	1. Auto page skip function select switch is *On*. 2. Computer is inserting boundary skip.
Printer changed print size.	1. A print size control code was received.
Print head catches on ribbon.	1. Head too close to paper; adjust Forms Thickness Adjust Lever. 2. Stuck print head needle. 3. Controller malfunction.
Print head and paper move but nothing is printed.	1. Print head cable is unplugged from controller. 2. Controller malfunction.
Print columns do not line up in proportional mode when the same characters are printed in each line.	1. Carriage return command is being sent at end of each line instead of at end of paragraph.
End of paper not being detected.	1. Paper dust or other obstructions preventing paper-out sensor from operating properly.



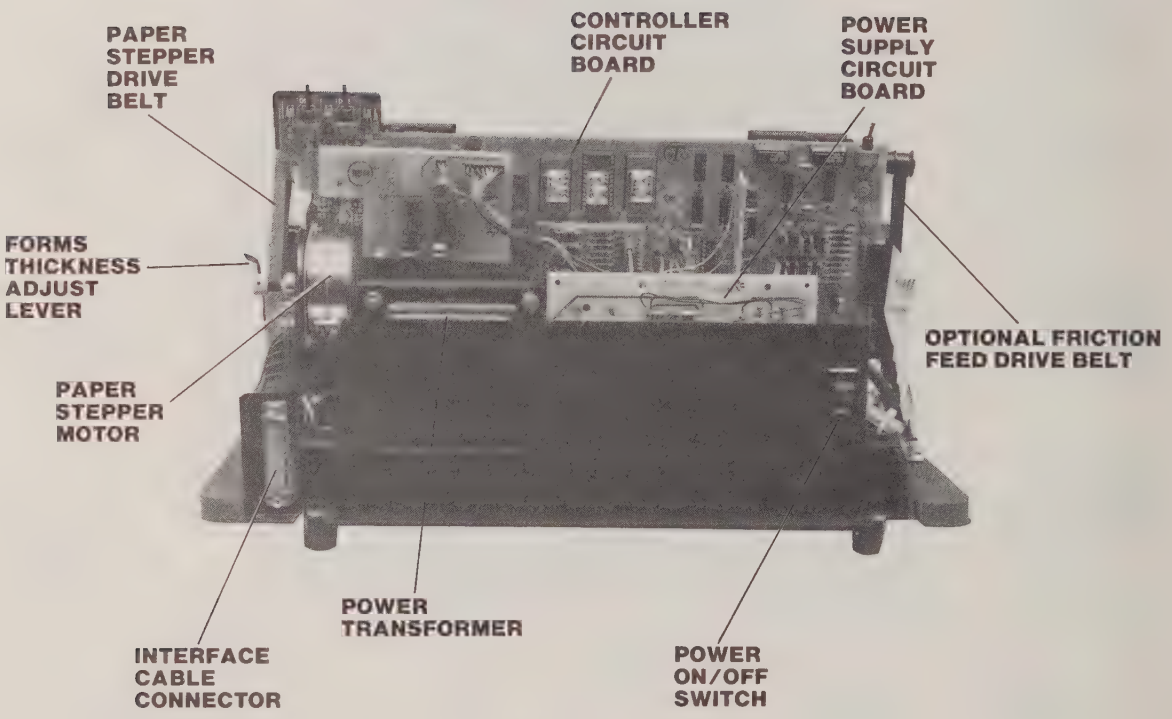
NOTE
PRINTER SHOWN WITH SEMI-AUTOMATIC SHEET FEED OPTION INSTALLED.

Figure 8-1. PRISM 80 Printer Assembly Locations, Front View



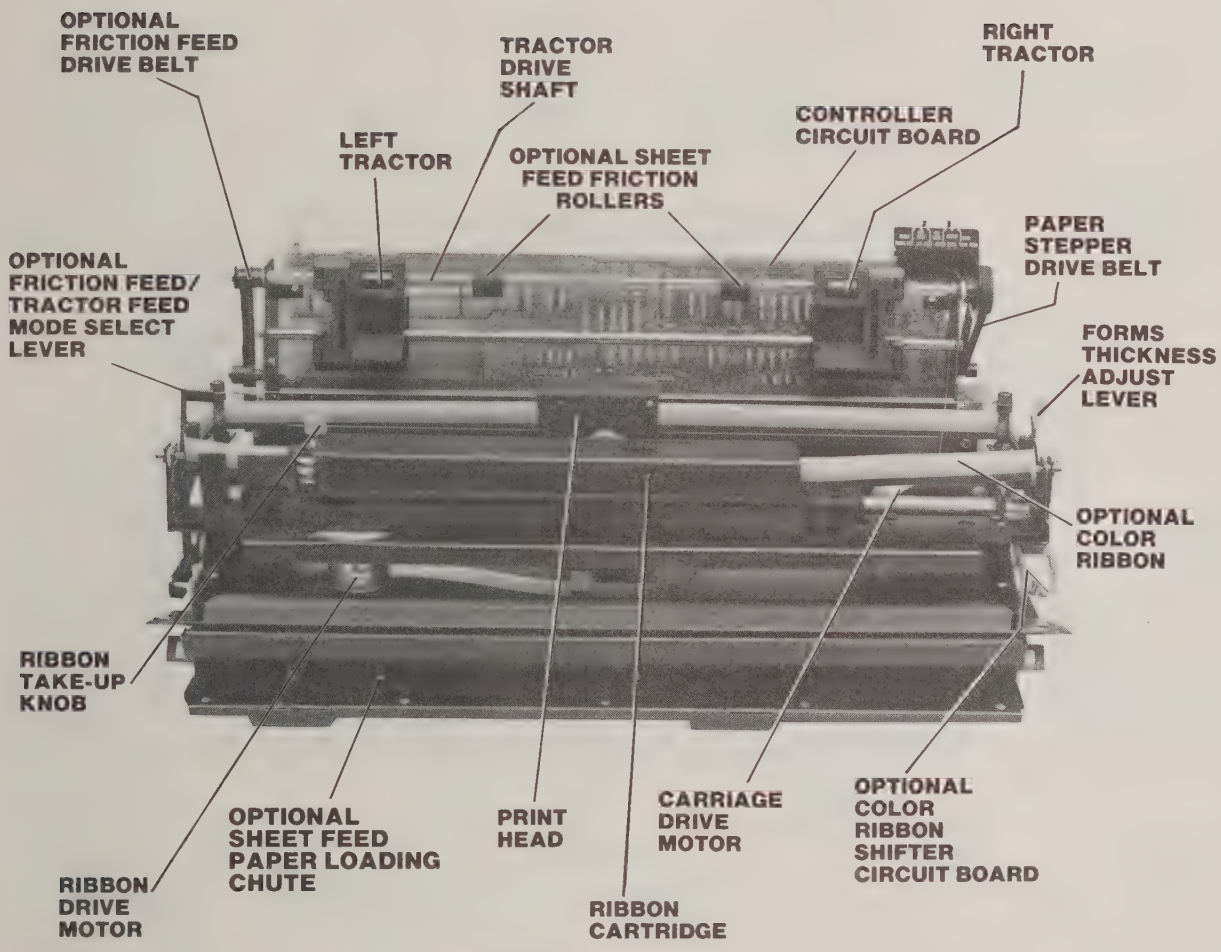
NOTE
PRINTER SHOWN WITH SEMI-AUTOMATIC SHEET FEED OPTION INSTALLED.

Figure 8-2. PRISM 80 Printer Assembly Locations, Top View



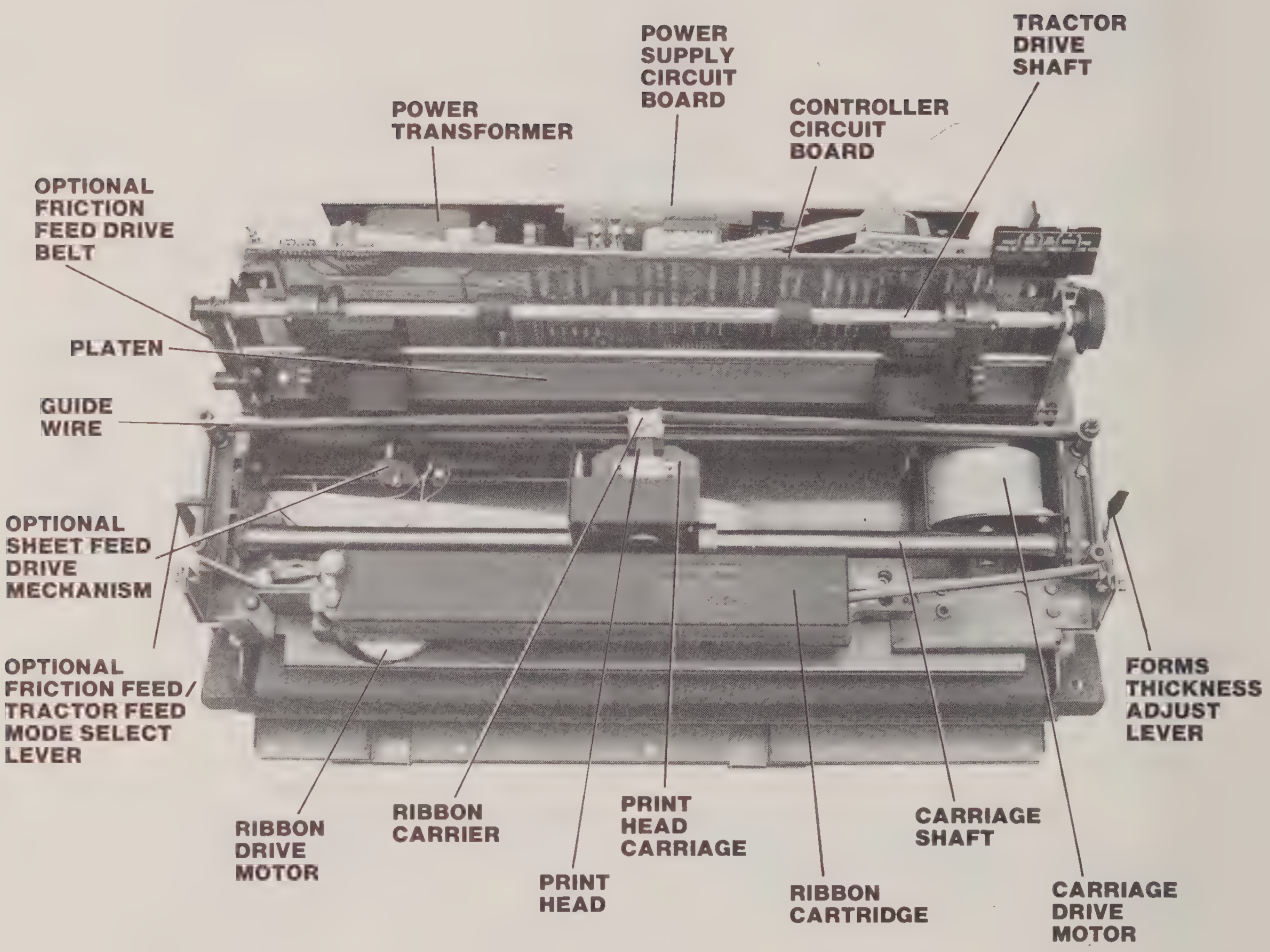
NOTE
PRINTER SHOWN WITH SEMI-AUTOMATIC SHEET FEED OPTION INSTALLED.

Figure 8-3. PRISM 80 Printer Assembly Locations, Rear View



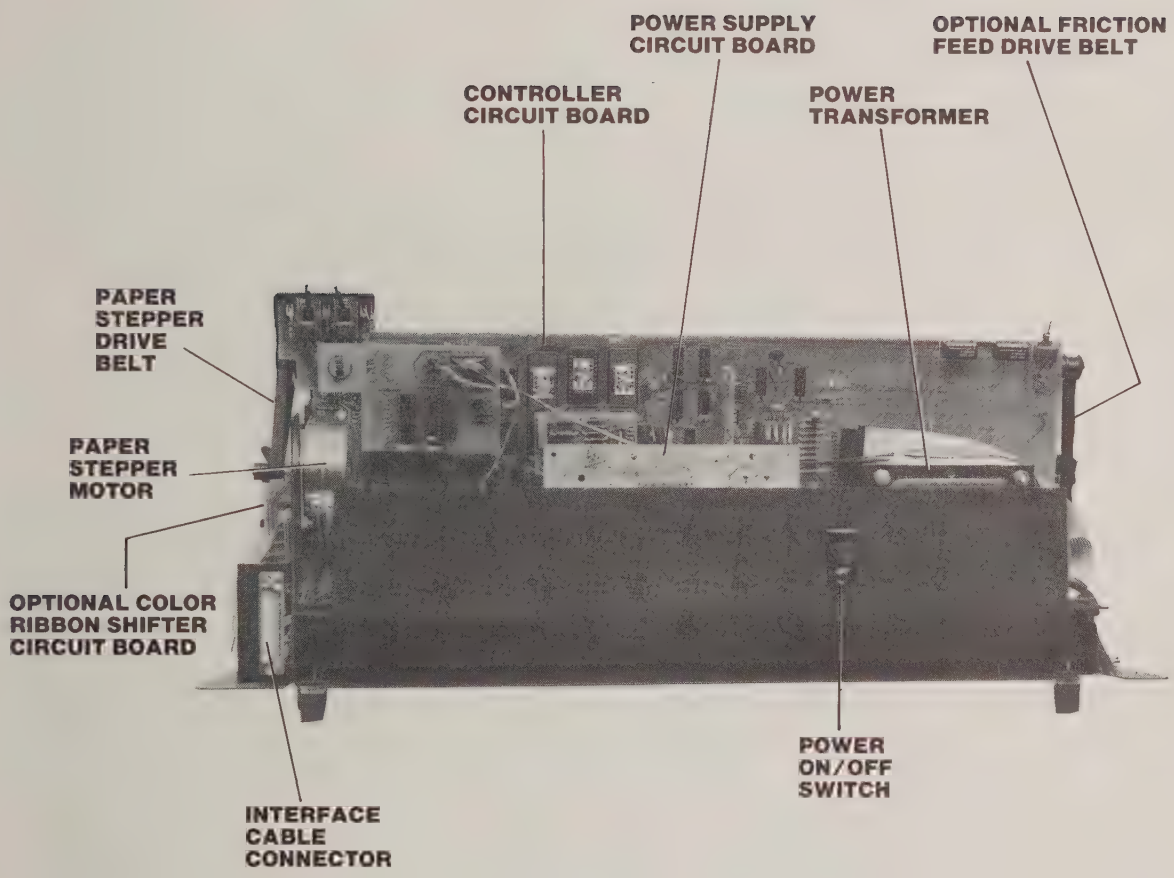
NOTE
PRINTER SHOWN WITH SEMI-AUTOMATIC SHEET FEED OPTION AND COLOR OPTION INSTALLED.

Figure 8-4. PRISM 132 Printer Assembly Locations, Front View



NOTE
PRINTER SHOWN WITH SEMI-AUTOMATIC SHEET FEED OPTION AND COLOR OPTION INSTALLED.

Figure 8-5. PRISM 132 Printer Assembly Locations, Top View



NOTE
PRINTER SHOWN WITH SEMI-AUTOMATIC SHEET FEED OPTION AND COLOR OPTION INSTALLED.

Figure 8-6. PRISM 132 Printer Assembly Locations, Rear View

APPENDIX A

OPERATIONAL PROCEDURES FOR THE PRISM PRINTER™ SEMI-AUTOMATIC SINGLE-SHEET FRICTION FEED OPTION

APPENDIX A
OPERATIONAL PROCEDURES FOR THE PRISM PRINTER™ SEMI-AUTOMATIC SINGLE-SHEET FRICTION FEED OPTION

A.1 INTRODUCTION

The semi-automatic single-sheet friction feed option for the PRISM 80 and PRISM 132 dot matrix impact printers allows the use of single sheets of paper (letterhead, for example) as well as pinfeed paper to meet all of your text or data printing requirements.

Each printer is designed to use 15 to 25 lb. single sheet bond paper. The PRISM 132 printer uses paper widths ranging from 7.0 inches minimum to 8.5 inches maximum; paper length ranges from 8.5 inches minimum to 17.0 inches maximum. The PRISM 80 printer uses paper widths ranging from 7.0 inches minimum to 8.5 inches maximum; paper length ranges from 8.5 inches minimum to 17.0 inches maximum.

Operation of the printer with the single sheet friction feed is convenient and easy: all you have to do is set a paper feed mode select lever, adjust paper guides, turn the printer on, and insert a sheet of paper into a paper loading chute at the front of the printer. The printer will then automatically feed the paper through the printer and position it for printing.

Figure A-1 shows the printer with the semi-automatic single sheet friction feed option installed. From an operator's standpoint, there are three additional operational areas to consider beyond the basic printer:

- Paper feed mode (friction feed or tractor feed) select lever
- Paper friction rollers
- Paper loading chute

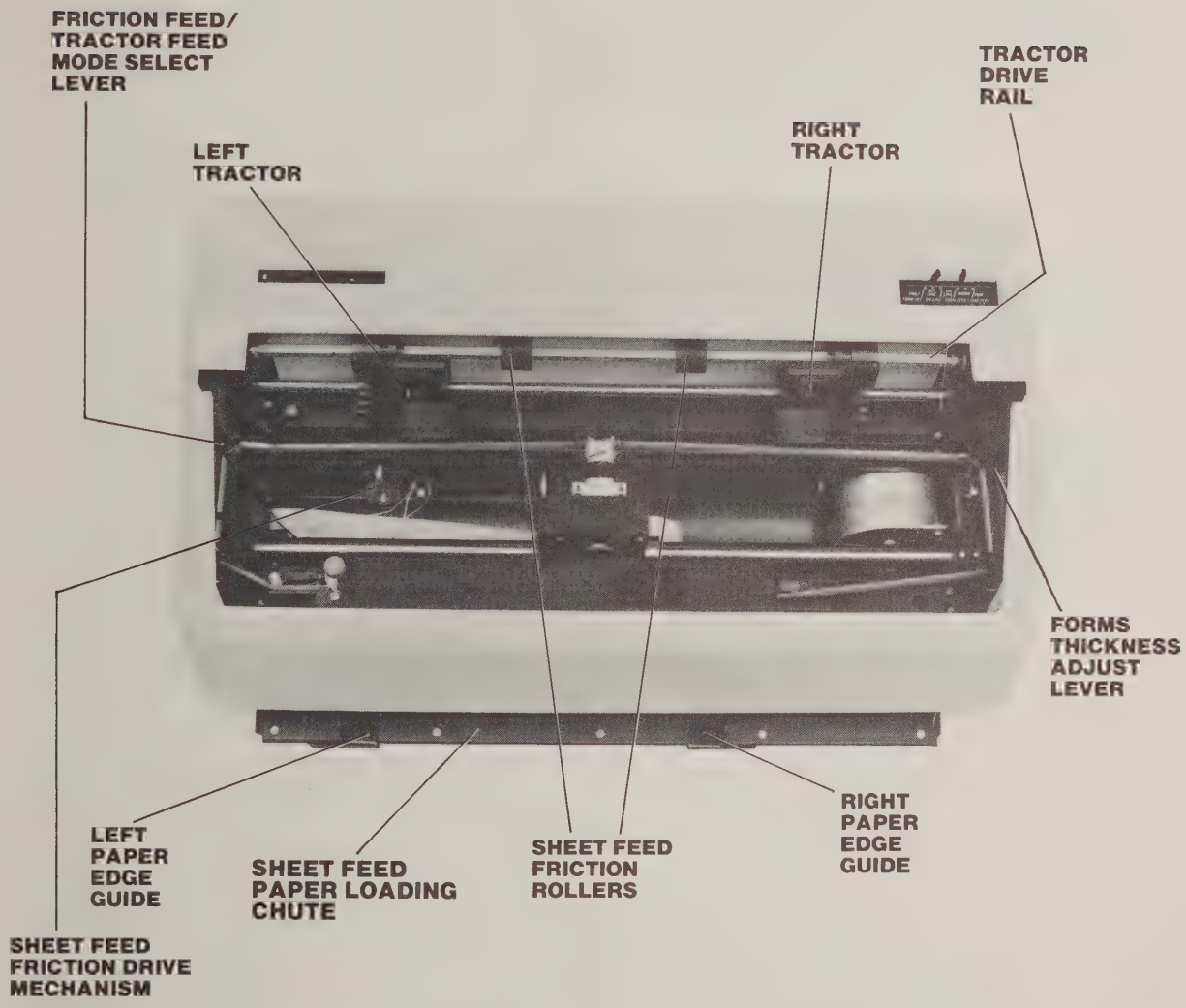
As shown in Figure A-1, the paper feed mode select lever is under the plastic window, on the left side of the printer. Positioning the lever toward the back of the printer selects the single sheet friction feed mode; positioning the lever toward the front selects tractor feed.

There are two adjustable paper friction rollers on the tractor drive rail. The rollers are used with the two tractors and the drive rail to align and hold paper in place during paper movement and printing.

The paper loading chute is at the bottom front of the printer. The chute is used for loading single sheets of paper, one at a time, into the printer. The chute has left and right adjustable paper edge guides for centering the paper with the friction rollers and tractors, and for manually setting print margins. The left paper guide is calibrated for approximate paper centering and for setting print margins. The chute can also be used for feeding pinfeed paper into the printer by moving the paper guides out of the way.

Except for paper loading and feeding, the printer is operated in much the same way and with the same controls, indicators and function select switches as the basic printer. Details of paper loading and feeding with the semi-automatic single-sheet friction feed option are given in paragraph A.2 of this appendix.

Maintenance of the printer with the single-sheet option consists of routine cleaning and ribbon changing, as described in Section 7 of the basic manual; there are no operator adjustments.



NOTE
THE PRISM 132 PRINTER IS SHOWN; THE PRISM 80 IS SIMILAR, DIFFERING ONLY IN SIZE, WEIGHT AND CARRIAGE WIDTH.

Figure A-1. PRISM Printer™ With Semi-Automatic Single Sheet Feed Option Installed

A.2 OPERATION

The following paragraphs explain how to operate the printer with single-sheet paper and the function select switches. Also included are procedures for adjusting the paper guides, manually setting print margins, manually setting the top-of-paper position, and making print head adjustments. The print margins and top-of-paper position may also be set with control codes and programming as explained in Section 6 of the basic manual.

A.2.1 CONTROLS, INDICATORS AND FUNCTION SELECT SWITCHES

The single-sheet paper option uses the same controls, indicators and function select switches as described in Section 4 of the basic manual, plus one new control. Note, too, that the function of the ON/OFF and FORM FEED/LINE FEED switches are slightly modified to reflect the single-sheet paper option. The function changes and new control are described below:

Control/Indicator	***Function***
ON/OFF AC Power Switch	Turns the printer on or off. When switched on, power is applied to the printer, and the printer automatically ejects any paper.
FORM FEED/NORM/LINE FEED Momentary Contact Spring-Return-to-Center Switch	Vertically positions paper as follows: 1. With the FORMSET/OFFLINE/ONLINE switch at OFFLINE, a. Momentarily positioning the FORM FEED/LINE FEED switch to FORM FEED will eject single-sheet paper from the printer. b. Momentarily positioning the FORM FEED/LINE FEED switch to LINE FEED will advance the paper one line. c. Holding the FORM FEED/LINE FEED switch at LINE FEED will advance the paper one line, then continuously line feed until the previously set form length is reached. At that point, the printer will issue a form feed command (corresponding to the previously set forms length) to eject the paper.
Paper Feed Mode Select Lever	Selects either the single-sheet or pinfeed paper mode of operation.

NOTE

The NORM position is the spring-return-to-center Off position of the switch.

A.2.2 OPERATION

The printer is operated with single-sheet paper as follows:

> **CAUTION**
>
> *If you are using paper widths less than 8½ inches for the PRISM 80 or less than 14.0 inches for the PRISM 132, you must set the left and right margins for the paper width being used. Otherwise, the print head may print off the paper, across the platen; damage to the print head could occur if printing off the paper. For procedures on setting left and right margins, refer to Section 6, paragraph 6.2.2.*

a. Ensure that the printer is connected to the ac power source and your computer.

b. Remove the printer window and any previously loaded pinfeed paper.

c. Set the printer controls as follows:

Control	***To***
Power ON/OFF Switch	OFF
FORMSET/OFFLINE/ONLINE Switch	OFFLINE
Self-Test Switch	Set to the left.
Function Select Switches DIP S3 and DIP S4	Set per Table 4-2 and Figure 4-2 in Section 4 of the basic manual. Set the forms length switch (DIP S3, switches SW1, SW2, SW3) to the length of the paper being used.
Paper Feed Mode Select Lever	Set towards the back of the printer to select the single-sheet friction feed mode.

d. For initial operation and thereafter on an as required basis:

   1. Adjust the paper guides and the print margins per paragraph A.2.3 (margins can also be programmed, see Section 6 in the basic manual).
   2. Manually set the top-of-paper position per paragraph A.2.4 (the top-of-paper position can also be programmed, see Section 6).
   3. Adjust the print head for optimum print quality per paragraph A.2.5.

e. Reinstall the printer window.

f. Position the ON/OFF switch to ON. The following will occur:

   1. The PWR and FAULT indicators will light; the FAULT indicator will stay lit until paper is loaded.
   2. The printer paper feed mechanism will briefly energize to eject any paper in the printer.
   3. The print head will move to the left.

g. Insert a sheet of paper into the paper loading chute, between the previously set left and right paper guides.

NOTE

The printer is designed for use with 15 to 25 lb. bond paper. Other thicknesses or multiple sheets should be tested in the printer for feed-through and print clarity before using.

h. Carefully push the paper into the printer until it is picked up by the friction feed mechanism. In approximately ½ second, the printer will automatically feed the paper through the printer and stop the paper at the previously set top-of-paper position or, if not set, at the first printable line on the paper.

NOTE

If the paper misfeeds, remove it from the printer, momentarily position the FORM FEED/LINE FEED switch to FORM FEED to clear the printer, then reinsert the paper into the printer.

i. Position the FORMSET/OFFLINE/ONLINE switch to ONLINE; the ONLINE indicator will light.

j. Initiate printing from your computer. When the printing nears the bottom of the sheet of paper (within one inch if the printer is in automatic boundary skip mode), the printer will automatically stop the print cycle and eject the paper from the printer.

NOTE

The paper can be ejected from the printer at any time by positioning the FORMSET/OFFLINE/ON-LINE switch to OFFLINE, momentarily positioning the FORM FEED/LINE FEED switch to FORM FEED, and switching back ONLINE.

k. To resume printing, insert a new sheet of paper into the loading chute. The printer will automatically position the paper to the previously set top-of-paper position and resume printing.

NOTE

Do not insert a new sheet of paper into the printer until the sheet in the printer is ejected.

If the paper jams during the print cycle, switch OFFLINE, remove the window, carefully pull the jammed paper out of the printer, reinstall the window, momentarily position the FORM FEED/ LINE FEED switch to FORM FEED, insert a new sheet of paper into the printer and switch back ONLINE to resume printing.

A.2.3 ADJUSTING THE PAPER GUIDES AND SETTING PRINT MARGINS

The left and right paper guides, friction rollers and tractors are set during initial operation of the printer or at any time if paper widths are changed. This is accomplished as follows:

a. Remove the printer window.

b. Ensure that power is connected, the power ON/OFF switch is at ON, the paper feed mode select lever is positioned toward the back of the printer, and the FORMSET/OFFLINE/ONLINE switch is at OFFLINE.

c. Unlock each tractor, slide each tractor to its outermost position, and open the tractor doors.

d. Slide the left paper guide (see Figure A-1) so that the vertical plate of the guide is aligned with the C (center) position on the calibration strip.

e. Set a test sheet of paper of the width and weight you will be using up against the vertical plate of the left margin guide, then slide the right paper guide up to the right edge of the paper. Position the paper and guides as close together as possible without causing paper binding.

f. Carefully push the paper into the printer until it is picked up by the friction feed mechanism. In approximately ½ second, the printer will automatically feed the paper through the printer and stop the paper at the first printable line.

g. Position the FORM FEED/LINE FEED switch to LINE FEED until the paper moves up between the tractors to the top of the tractors.

h. Slide the left paper friction rollers along the tractor drive rail until the outside edge of the roller is even with the left edge of the paper; slide the right roller along the rail until the outside edge of the roller is even with the right edge of the paper.

i. Slide each tractor up against its respective paper friction roller, close the tractor doors (the roller in the tractor door should be over the friction roller when the door is closed), and lock the tractors in place.

j. Eject the paper by momentarily positioning the FORM FEED/LINE FEED switch to FORM FEED.

k. Check the paper path through the printer as follows:

    1. Reinsert the test sheet of paper between the left and right margin guides and up into the printer until it is picked up by the friction feed mechanism.

    2. Position the FORM FEED/LINE FEED switch to LINE FEED until the paper moves up between the tractors. If the paper catches on one or both tractors, open the tractor doors, carefully pull the paper out, readjust the friction rollers and tractors, momentarily position the FORM FEED/LINE FEED switch to FORM FEED to clear the printer, and reinsert a sheet of paper into the printer to recheck the paper path.

    3. Eject the paper by momentarily positioning the FORM FEED/LINE FEED switch to FORM FEED.

l. Check the print margins as follows:

    1. Insert a test sheet of paper into the paper loading chute, between the paper guides.

    2. Push the paper into the printer until it is picked up by the friction feed mechanism.

    3. Position the Self-Test Switch to the right for several seconds to run a test pattern.

    4. Check the pattern for margin placement. If the margins are not correct, readjust the paper guides, friction rollers and tractors as outlined above.

m. Reinstall the window and resume printing.

A.2.4 SETTING TOP-OF-PAPER POSITION

The top-of-paper position is set during initial set-up of the printer to the single sheet mode of operation or at any time to change a previously established top-of-paper position. This is accomplished as follows:

> **NOTE**
>
> *The top-of-paper position can also be set via programming from your computer (see Section 6).*

a. Check that the power switch is at ON, the feed select lever is set toward the back of the printer, and the FORMSET/OFFLINE/ONLINE switch is at OFFLINE.

b. Feed a sheet of paper into the printer until the friction feed rollers pick it up. The printer will either feed the paper to the previously set top-of-paper position or to the first printable line on the top of the paper.

c. If the paper is not positioned as required, perform the following:

   1. Position the FORMSET/OFFLINE/ONLINE switch to FORMSET.
   2. Position the FORM FEED/LINE FEED switch to FORM FEED to move the paper down or to LINE FEED to move the paper up. Paper will step in increments of 1/48 inch.
   3. When the desired top-of-paper position is obtained, release the FORM FEED/LINE FEED switch.
   4. The top-of-paper position is now set and the printer will automatically feed each new sheet of paper to that setting for as long as the printer is ON.

> **NOTE**
>
> *The printer will default to the first printable line position whenever the printer is turned off.*

d. *Position the FORMSET/OFFLINE/ONLINE switch to ONLINE and resume printing.*

A.2.5 PRINT HEAD ADJUSTMENT

The print head can be adjusted to lighten or darken print and to compensate for different thicknesses of paper. To adjust, proceed as follows:

a. Remove the printer window.

b. Check that the power switch is at ON, the feed select lever is set toward the back of the printer, and the FORMSET/OFFLINE/ONLINE switch is at OFFLINE.

c. Feed a sheet of test paper (same size and weight as will be printed on) into the printer until the friction feed rollers pick it up; the printer will automatically position the paper for printing.

d. Position the Self-Test Switch to the right for several seconds to print a test pattern.

e. Check the print quality of the test pattern. If printing is too light, move the print head closer to the paper by moving the Forms Thickness Adjust Lever toward the back of the printer. If the print is too dark, move the print head back from the paper by moving the lever toward the front of the printer. Ribbon and print head life will be extended at lighter settings.

f. Run a test pattern and recheck the print quality; adjust the print head as necessary, then reinstall the printer window.

> **NOTE**
>
> *If the print continues to be light, the ribbon may need replacement. Ribbon replacement procedures are included in Section 7.*

g. Eject the test sheet by positioning the FORM FEED/LINE FEED switch to FORM FEED.

h. Insert a new sheet of paper into the printer, position the FORMSET/OFFLINE/ONLINE switch to ONLINE, and resume printing.

APPENDIX B

OPERATIONAL PROCEDURES FOR THE PRISM PRINTER™ DOT PLOT™ GRAPHICS OPTION

APPENDIX B
OPERATIONAL PROCEDURES FOR THE PRISM PRINTER™ DOT PLOT™ GRAPHICS OPTION

B.1 INTRODUCTION

The Dot Plot™ graphics option for the PRISM 80 and PRISM 132 series of printers enables you to print illustrations, charts, graphs and block letters using specific patterns of printed dots.

Graphics resolution is 84 dots per inch both vertically and horizontally. By selectively energizing specific print head wires during each horizontal scan across a page, specific patterns of dots are printed to create the desired graphics image. Each dot is formed by a 14 mil (one mil = 1/1000 inch) diameter print head wire. The actual printed dot size will vary between 15 and 17 mils due to differences in paper hardness, humidity and ribbon wear. The dots are printed on 1/84 inch centers (approximately 12 mils).

B.2 OPERATION

The printer is placed in the graphics mode by:

a. Setting the expanded function select switch (DIP S4, switch SW7) to *On* and the automatic line feed switch (DIP S4, switch SW5) to *Off* (see Section 4 in the basic manual for switch locations).

b. Sending an ETX character (CTRL-C) to the printer to place it in the graphics mode.

Once in the graphics mode, printing of dots to form a graphic image is controlled by the setting of bits in each character. Paper positioning and print head movement are controlled by control codes.

Characters received by the printer are printed in a single vertical column (see Figure B-1) about 1/84 inch wide and seven dots high. Successive characters are printed in adjacent vertical columns (see Figure B-2). Each of the seven print head wires is addressable by one bit of each byte, giving you total control over all dots on a page. As shown in Figure B-1, only the seven least significant bits in each character are used. The least significant bit (Bit 0) controls the top dot and Bit 6 controls the bottom dot. A dot is printed only when a specific bit is set. The following BASIC commands demonstrate dot control:

10 PRINT CHR$ (1);	Print the top dot
10 PRINT CHR$ (64);	Print the bottom dot
10 PRINT CHR$ (7);	Print the top three dots
10 PRINT CHR$ (0);	Print a "graphics space"

The top two dots can also be printed by sending the ETX code twice in succession. The BASIC command for this is:

10 PRINT CHR$ (3); CHR$ (3);	Print an ETX character in graphics (the top two dots will be printed).

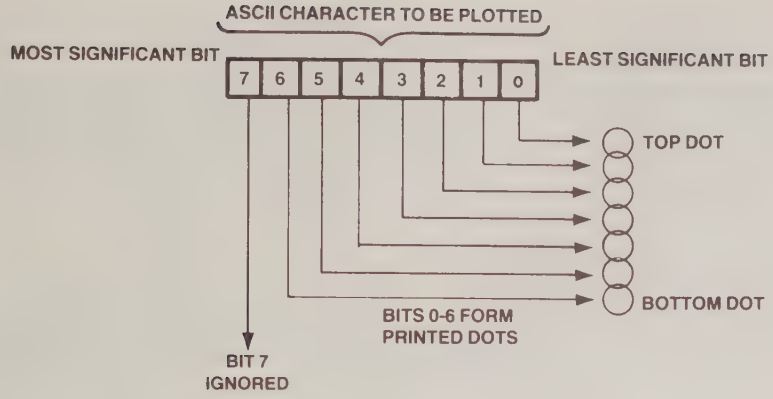
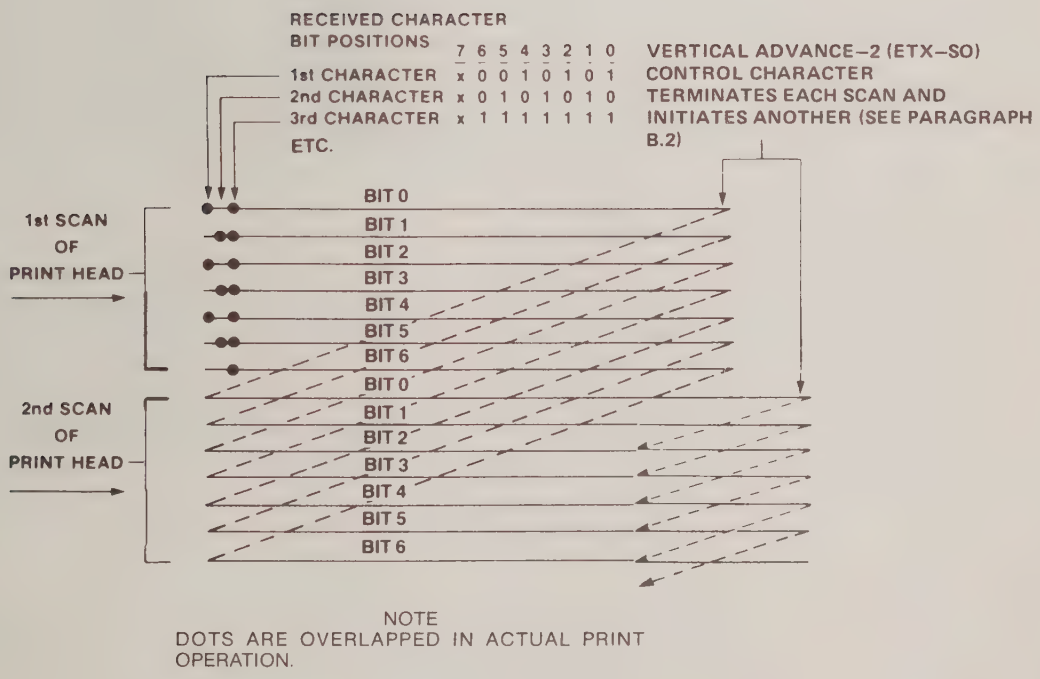


Figure B-1. Bit Mapping


RECEIVED CHARACTER BIT POSITIONS
7 6 5 4 3 2 1 0
1st CHARACTER x 0 0 1 0 1 0 1
2nd CHARACTER x 0 1 0 1 0 1 0
3rd CHARACTER x 1 1 1 1 1 1 1
ETC.
VERTICAL ADVANCE–2 (ETX–SO) CONTROL CHARACTER TERMINATES EACH SCAN AND INITIATES ANOTHER (SEE PARAGRAPH B.2)
1st SCAN OF PRINT HEAD
2nd SCAN OF PRINT HEAD
BIT 0
BIT 1
BIT 2
BIT 3
BIT 4
BIT 5
BIT 6
BIT 0
BIT 1
BIT 2
BIT 3
BIT 4
BIT 5
BIT 6

NOTE
DOTS ARE OVERLAPPED IN ACTUAL PRINT OPERATION.

Figure B-2. Print Head Scanning

Paper positioning and print head movement are controlled by the control codes listed in Table B-1. Unlike dot printing, each control code must be preceded by an ASCII ETX. Once in the graphics mode, the ETX is considered an escape or special character; this tells the printer that a special function is to be performed as determined by the next character in the command. For example, the printer can be taken out of the graphics mode and returned to the normal print mode by sending an ETX-STX combination similar to this BASIC command:

```
10 PRINT CHR$ (3); CHR$ (2);
```

where (3) = ETX escape code (see Table B-1)
(2) = Decimal code for entering the normal print mode (see Table B-1)

Vertical Advance-2 controls both paper and print head positioning. During power-up, the printer is programmed to provide graphics linefeeds. The current line is printed and paper advanced 7 dots when it is received.

ASCII character SO (Control-N) performs Vertical Advance-2 with a carriage return. ASCII character DC4 (Control-M) performs Vertical Advance-2 without a carriage return. BASIC commands to perform this might look like the following:

`10 PRINT CHR$ (3); CHR$ (20);`	Print current line and graphics linefeed, do not carriage return.
`10 PRINT CHR$ (3); CHR$ (14);`	Print current line and graphics linefeed; return carriage to start the next line.

Note that each of the CHR$ functions above are followed by semicolons to prevent BASIC from issuing its own set of carriage returns and linefeed. This would cause these characters to be printed as graphics characters.

Double density graphics (overlapping of dots to produce high density graphic images) can be programmed in the graphics mode. This is done by programming one of the vertical advance commands in 2/48 inch increments to achieve vertical overlap. The absolute horizontal position command is used to move the image 1/120 inch in the horizontal axis.

B.3 GRAPHICS CONSIDERATIONS

The computer must issue graphics characters exactly as they are sent from the controlling software. Many computers trap special control characters and either delete or change them or issue special sequences in place of the actual data sent by the controlling program. This can be a serious problem if, for example, the computer is trying to maintain a line length of 40 characters and the graphics output consists of 400 characters per line.

Often times it is possible to prevent graphics characters from being trapped by adding decimal 128 (setting the most significant bit of the character) to whatever graphics codes are being sent. The printer ignores this bit.

Table B-1
Graphics Mode Control Codes
(Expanded Function Select Switch DIP S4 Switch SW7 On)

ASCII Control Code	Decimal Code	Hexa-decimal Code	Keyboard Control Code	Printer Function
STX	02	02	CTRL-B	Enter normal print mode (exit graphics mode).
ETX	03	03	CTRL-C	Print ETX as graphics character.
HT	09	09	CTRL-I	Horizontal tab to next tab position.
LF	10	0A	CTRL-J	Carriage return and line feed (Vertical ADV-1).
VT	11	0B	CTRL-K	Vertical tab to next tab position.
FF	12	0C	CTRL-L	Form feed to next page.
CR	13	0D	CTRL-M	Carriage return to same line, and line feed if "Auto Line Feed" switch is enabled.
SO	14	0E	CTRL-N	Carriage return and vertical feed (Vertical ADV-2). (1½ inch default-"Graphics" line feed.)
DC2	18	12	CTRL-R	Vertical ADV-1 without carriage return.
DC4	20	14	CTRL-T	Vertical ADV-2 without carriage return.
EM	25	19	CTRL-Y	Vertical ADV-3 without carriage return.

APPENDIX C

OPERATIONAL PROCEDURES FOR THE PRISM PRINTER™

SPRINT MODE™ OPTION

APPENDIX C
OPERATIONAL PROCEDURES FOR THE PRISM PRINTER™ SPRINT MODE™ OPTION

C.1 INTRODUCTION

The Sprint Mode™ option for the PRISM 80 and PRISM 132 dot matrix impact printers allows you to print draft quality text or data at over 200 characters per second. Addition of this option to the basic PRISM Printer™ with its correspondence quality printing extends the printer's capabilities to include applications requiring high speed draft printing.

The Sprint Mode™ option uses an 18x9 dot matrix that permits high speed printing but with more open characters (less dense) than those obtained in the correspondence mode with its 24x9 dot matrix. Character pitches available with the Sprint Mode™ option include 10, 12, 13.3 and 16.8 cpi.

All the functions available with the correspondence mode are equally applicable with the Sprint Mode™ option, including: enhanced (double width) characters, fixed or proportional spacing, text justification, switch or software selectable character pitches, and the function select switch and software control features. This allows draft printing in the exact form as it would appear in the correspondence mode.

C.2 OPERATION

Other than selecting the draft or correspondence font and selecting the character pitch, operation of the printer with the Sprint Mode™ option is the same as that described in the basic manual. Therefore, the following paragraphs discuss only font and pitch selection; you should refer to the appropriate section in the basic manual for all other printer operating procedures.

C.2.1 CONTROLS, INDICATORS AND FUNCTION SELECT SWITCHES

The PRISM Printer™ with the Sprint Mode™ option uses the same controls, indicators and function select switches described in Section 4 of the basic manual. However, function select switch DIP S4 switches SW1, SW2 and SW6 have been redefined for the Sprint Mode™ option, as shown in Table C-1 and Figure C-1. Switch SW6 selects the print font, and switches SW1 and SW2 select the character pitch.

C.2.2 SWITCH SELECTION OF FONT AND CHARACTER PITCH

Selection of the draft or correspondence font and the character pitch can be accomplished through function select switch DIP S4, switches SW1, SW2 and SW6; selection can also be made through programming as described in paragraph C.2.3.

Positioning switch SW6 (DIP S4) to *On* selects the draft font; positioning the switch to *Off* selects the correspondence font. Character pitches are selected by appropriately positioning switches SW1 and SW2 to *On* or *Off* as shown in Figure C-1.

Remember, whenever changing the settings of the function switches, you must *ALWAYS* turn the printer OFF, reset the switch(es), and turn the printer ON. Otherwise, the printer will not acknowledge the new settings.

Table C-1
Function Select Switches

Function Select DIP 4		Function Select DIP S3	
SW1 & SW2*	Selects a correspondence quality character print density of 5 (double width), 10, 12, or 16.8 cpi or a draft quality character print density of 10, 12, 13.3 or 16.8 cpi.	SW1, SW2 & SW3*	Selects one of eight available lengths from 3 to 14 inches (76.2 to 355.6 mm).
SW3*	Selects line spacing at either 6 or 8 lines per inch.	SW4 & SW5	Selects serial data baud rate of incoming serial digital data as 300, 1200, 2400, or 9600 baud.
SW4	Enables or disables an automatic 1-inch skip at form boundaries. (Skip is programmable; see Section 6.)	SW6 & SW7	Defines parity checking functions for data characters received in serial mode.
SW5	Enables or disables an automatic line feed upon receiving a CR (carriage return) control character.		
SW6	Selects correspondence or draft font (may also be programmed; see paragraph C.2.3).		
SW7	Enables or disables expanded software control functions (see Section 6).		

*Switch settings which may be redefined via software control codes.

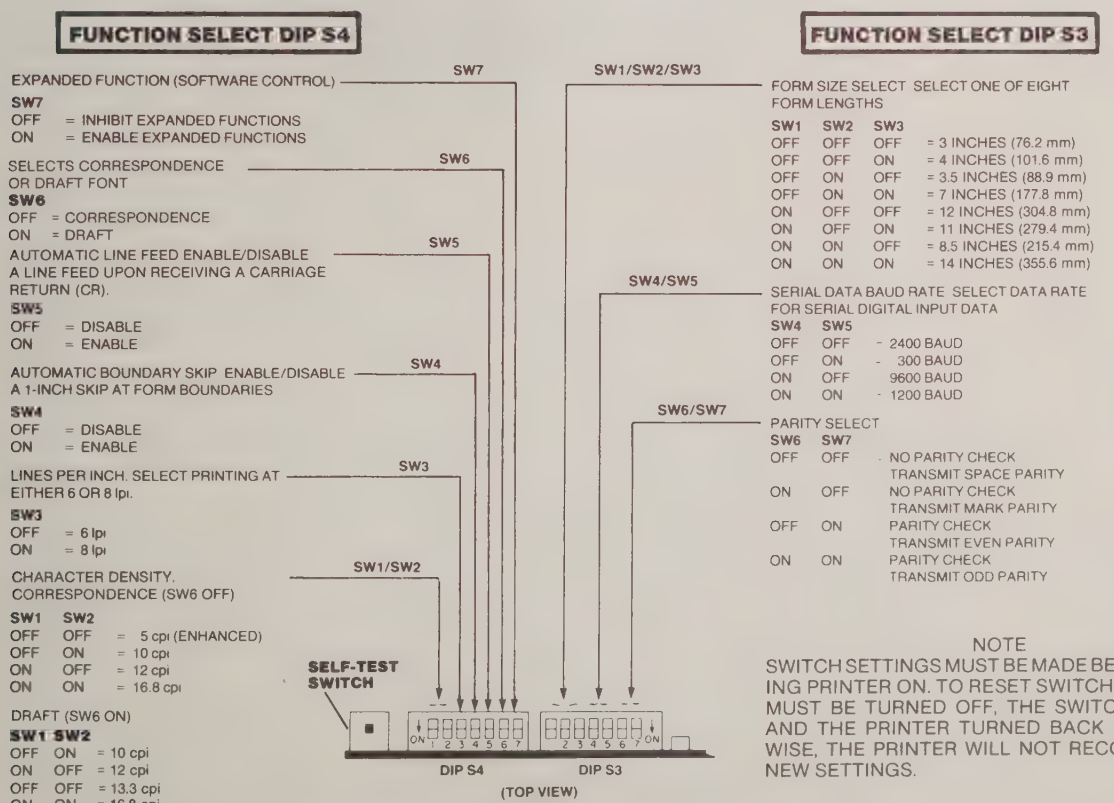

FUNCTION SELECT DIP S4
EXPANDED FUNCTION (SOFTWARE CONTROL)
SW7
SW7
OFF = INHIBIT EXPANDED FUNCTIONS
ON = ENABLE EXPANDED FUNCTIONS
SELECTS CORRESPONDENCE OR DRAFT FONT
SW6
SW6
OFF = CORRESPONDENCE
ON = DRAFT
AUTOMATIC LINE FEED ENABLE/DISABLE A LINE FEED UPON RECEIVING A CARRIAGE RETURN (CR).
SW5
SW5
OFF = DISABLE
ON = ENABLE
AUTOMATIC BOUNDARY SKIP ENABLE/DISABLE A 1-INCH SKIP AT FORM BOUNDARIES
SW4
SW4
OFF = DISABLE
ON = ENABLE
LINES PER INCH. SELECT PRINTING AT EITHER 6 OR 8 lpi.
SW3
SW3
OFF = 6 lpi
ON = 8 lpi
CHARACTER DENSITY. CORRESPONDENCE (SW6 OFF)
SW1/SW2
SW1 SW2
OFF OFF = 5 cpi (ENHANCED)
OFF ON = 10 cpi
ON OFF = 12 cpi
ON ON = 16.8 cpi
DRAFT (SW6 ON)
SW1 SW2
OFF ON = 10 cpi
ON OFF = 12 cpi
OFF OFF = 13.3 cpi
ON ON = 16.8 cpi
SELF-TEST SWITCH
ON 1 2 3 4 5 6 7
2 3 4 5 6 7 ON
DIP S4
DIP S3
(TOP VIEW)
FUNCTION SELECT DIP S3
SW1/SW2/SW3
FORM SIZE SELECT SELECT ONE OF EIGHT FORM LENGTHS
SW1 SW2 SW3
OFF OFF OFF = 3 INCHES (76.2 mm)
OFF OFF ON = 4 INCHES (101.6 mm)
OFF ON OFF = 3.5 INCHES (88.9 mm)
OFF ON ON = 7 INCHES (177.8 mm)
ON OFF OFF = 12 INCHES (304.8 mm)
ON OFF ON = 11 INCHES (279.4 mm)
ON ON OFF = 8.5 INCHES (215.4 mm)
ON ON ON = 14 INCHES (355.6 mm)
SW4/SW5
SERIAL DATA BAUD RATE SELECT DATA RATE FOR SERIAL DIGITAL INPUT DATA
SW4 SW5
OFF OFF - 2400 BAUD
OFF ON - 300 BAUD
ON OFF 9600 BAUD
ON ON - 1200 BAUD
SW6/SW7
PARITY SELECT
SW6 SW7
OFF OFF NO PARITY CHECK TRANSMIT SPACE PARITY
ON OFF NO PARITY CHECK TRANSMIT MARK PARITY
OFF ON PARITY CHECK TRANSMIT EVEN PARITY
ON ON PARITY CHECK TRANSMIT ODD PARITY
NOTE
SWITCH SETTINGS MUST BE MADE BEFORE TURNING PRINTER ON. TO RESET SWITCHES, PRINTER MUST BE TURNED OFF, THE SWITCHES RESET, AND THE PRINTER TURNED BACK ON. OTHERWISE, THE PRINTER WILL NOT RECOGNIZE THE NEW SETTINGS.

Figure C-1. Function Select Switches

C.2.3 SOFTWARE SELECTION OF FONT AND CHARACTER PITCH

Selection of the draft or correspondence font can be programmed through your computer; selection of a character pitch can be accomplished with control codes (see Table 6-3 in the basic manual) or programming. Before programming, ensure that the printer's expanded function select switch (DIP S4, switch SW7) is at *On*.

A typical BASIC command for selecting the draft font and a character pitch of 10 cpi might look like this:

```
10 PRINT CHR$ (27); "R, 2, $"      Select Draft Font
20 PRINT CHR$ (29);                Select 10 cpi
```

where (27) = Escape code from Table 6-3
R = Command Character for Selecting Character Set
2 = Argument Value for Draft Font (1 is the Value for Selecting Correspondence Font)
$ = Terminator
(29) = ASCII Decimal Code (see Table 6-3) for selecting 10 cpi

NOTE

The printer, when turned off, will default to the function select switch settings.

APPENDIX D

OPERATIONAL PROCEDURES FOR THE PRISM PRINTER™ PRISM COLOR™ OPTION

APPENDIX D
OPERATIONAL PROCEDURES FOR THE PRISM PRINTER™ PRISM COLOR™ OPTION

D.1 INTRODUCTION

The Prism Color™ option for the PRISM 80 and PRISM 132 dot matrix impact printers allows you to print text and data in up to eight colors with the process color ribbon supplied. The process color ribbon has four horizontal color bands across the entire length of the ribbon. The colors, from the top of the ribbon to the bottom, are yellow, magenta, cyan and black, respectively. By mixing certain combinations of these colors, you can also obtain orange, violet, green and brown.

Available as accessory items are a primary color ribbon and an all black ribbon. The primary ribbon has four horizontal color bands: red, green, blue and black. These colors are not suitable for mixing.

Color selection is programmable, with the printer defaulting to the black band of the ribbon whenever the printer is turned ON. Shifting from color band to color band is controlled by software through an electro-mechanical ribbon shifter mechanism. During self-test, the ribbon shifter will automatically change the color band at the end of every printed page. Termination of self-test and switching back online will cause the printer to default to the black band.

The ribbon shifter mechanism consists of a motor-driven, cam operated shifter and a motor control board added to the right side of the printer, under the Forms Thickness Adjust Lever. The motor is software controlled to shift between color bands at an average shifting time of 100 milliseconds. A straight, horizontal ribbon path accommodates the four-band ribbon (as opposed to the skewed ribbon path for the basic printer).

Except for programming the printer for the color(s) required, operation of the printer with the color option is identical to that described in the basic manual. Programming information is given in paragraph D.2 of this appendix.

Maintenance of the printer with the color option consists of routine cleaning and ribbon cartridge changing as described in Section 7 of the basic manual. You should also periodically clean the ribbon guide (see Figure 7-1), platen, print head jewel, and ribbon rollers to avoid possible cross contamination of the colors.

D.2 OPERATION

Other than programming the printer to select colors, operation of the printer with the color option is the same as described in the basic manual. Therefore, the following paragraphs discuss software selection of colors only.

D.2.1 SOFTWARE SELECTION OF COLORS

The printer can be programmed through your computer to select any color on a ribbon or any combination of mixed colors (if using the process color ribbon). Colors can be changed within a line without returning the printhead to the left margin for each change.

Ribbon colors are programmed through an "Escape, Q, N, $" sequence where N = the ribbon color argument value from Table D-1. For example, if you wanted to select the magenta color on the process ribbon, a BASIC color selection command might look like this:

```
10 PRINT CHR$ (27); "Q, 2, $"
```

where (27) = Escape Code from Table 6-3 in the Basic Manual
Q = Command Character for Color
2 = Argument Value from Table D-1 for Selecting Magenta
$ = Terminator

As always, before programming, the expanded function select switch (DIP S4, switch SW7) must be set to *On*.

To mix two process colors and obtain a third color (see Table D-1) requires two separate color selection commands. The first command prints the first color; the second command overlays the second color onto the first to obtain the desired third color. Keep in mind that you must program the printhead to return to the beginning of the first line, word, or character(s) being overlayed before issuing the second color selection command. When mixing colors, you should always start with the lightest color and overlay with the darkest color last. This will help extend the life of the color ribbon.

If you are using an all-black ribbon, you should shift through the four black bands to extend the life of the ribbon. This can be done automatically by using a BASIC command similar to this:

```
10 PRINT CHR$ (27); "Q, 5, $"
```

where 5 = Argument Value from Table D-1 for selecting auto-shift.

By using this command, the ribbon will automatically shift to the next black band at the end of each page.

Table D-1
Ribbon Color Argument Values

Process Ribbon	***Primary Ribbon***	***Argument Value (N)***
Yellow	Red	1
Magenta	Green	2
Cyan	Blue	3
Black	Black	4
All Black Ribbon		
Automatic Band Shift		5
Process Ribbon Color Mixing		
Orange (Mix Yellow and Magenta)		1 and 2
Violet (Mix Magenta and Cyan)		2 and 3
Green (Mix Yellow and Cyan)		1 and 3
Brown (Mix Magenta and Black)		2 and 4

NOTE

Always print the lightest color first to avoid contamination of ribbon colors.

APPENDIX E
SELECTION OF INTERNATIONAL CHARACTER SETS

APPENDIX E
SELECTION OF INTERNATIONAL CHARACTER SETS

Resident in the basic PRISM Printer™ are seven correspondence quality international character sets plus the standard U.S. character set. The international character sets are English 1, English 2, French, Norwegian, German, Swedish and Spanish. Each is a complete character set with certain characters changed to reflect the unique character requirements of a specific language.

Selection of any one of the international character sets can be programmed through your computer, with the printer defaulting to the U.S. character set. Or, if a specific international character set will be used continuously, the printer can be reconfigured (via a jumper strap and function select switches) so that the specific set becomes standard, in place of the U.S. set. With the jumpered configuration, the printer will default to that specific set.

The following paragraphs explain how to program or reconfigure the printer for international character sets. If your printer has the Sprint Mode™ option installed, you can also program or reconfigure the printer for draft (high speed) printing in any one of the international character sets.

E.1 SOFTWARE SELECTION OF INTERNATIONAL CHARACTER SETS

Selection of any one of the seven correspondence quality international character sets can be programmed through your computer. All you need to do is ensure that the printer's expanded function select switch is *On*, then program the printer using an "Escape, R, N, $" sequence (where N = the character set number from Table E-1).

For example, a typical BASIC command for selecting the correspondence quality French character set might look like this:

```
10 PRINT CHR$ (27); "R, 7, $"
```

where (27) = Escape Code from Table 6-3 in the Basic Manual
R = Command Character from Table 6-4 for Character Set Selection
7 = Argument Value from Table E-1 for Correspondence Quality French Character Set
$ = Terminator

All the standard switch and software selectable capabilities (densities, spacing, etc.) explained in the basic manual are equally applicable when using the international character sets. Note that whenever the printer is powered down, the printer will default to the correspondence quality U.S. character set.

If your printer has the Sprint Mode™ installed, you can also program the printer for draft quality printing in any one of the international character sets. The BASIC command for draft printing would be the same as the correspondence quality except that the argument value changes (see Table E-1).

Table E-1
International Character Set Argument Values

Character Set	Correspondence Quality Argument Value	Draft Quality Argument Value
		(Valid Only With Sprint Mode™ Option Installed)
United States	1	2
English 1	3	4
English 2	5	6
French	7	8
Norwegian	9	10
German	11	12
Swedish	13	14
Spanish	15	16

NOTE

The printer defaults to the U.S. character set.

E.2 CONFIGURING FOR INTERNATIONAL CHARACTER SETS

The printer can be configured for switch selection of international character sets by installing a single jumper strap on the controller circuit board, as shown in Figure E-1. With the strap installed, the functions of DIP S4, switches SW1 through SW4 and SW6 are redefined to allow switch selection of a character set, as shown in Figure E-2 and Table E-2.

Once the jumper strap is installed, selection of an international character set consists of setting function select switches SW1 through SW4 of DIP S4 in accordance with Figure E-1 and Table E-2. Note that the printer will default to 6 lines per inch and 10 characters per inch when the jumper strap is installed. If you require different line spacing, character densities or any of the standard software selected functions, see Section 6 in the basic manual.

If your printer has the Sprint Mode™ option installed, you can also select draft quality printing via the function select switches (see Table E-2).

To install the jumper strap, proceed as follows:

WARNING

Ensure that the ac line power cord has been unplugged from the power source before proceeding with this procedure.

a. Check that the ac line power cord is unplugged.

b. Remove the four Phillips head screws holding the printer cover to the chassis (see Section 2, paragraph 2.3 for cover removal); remove the cover and set aside.

c. At the back of the printer, locate the "daughter" board on the component side of the controller board; the daughter board is on the upper left side of the controller board, just below the DIP switches.

d. Using Figure E-1 as a guide, locate jumper platform S1 on the component side of the daughter board and the top most jumper position on S1.

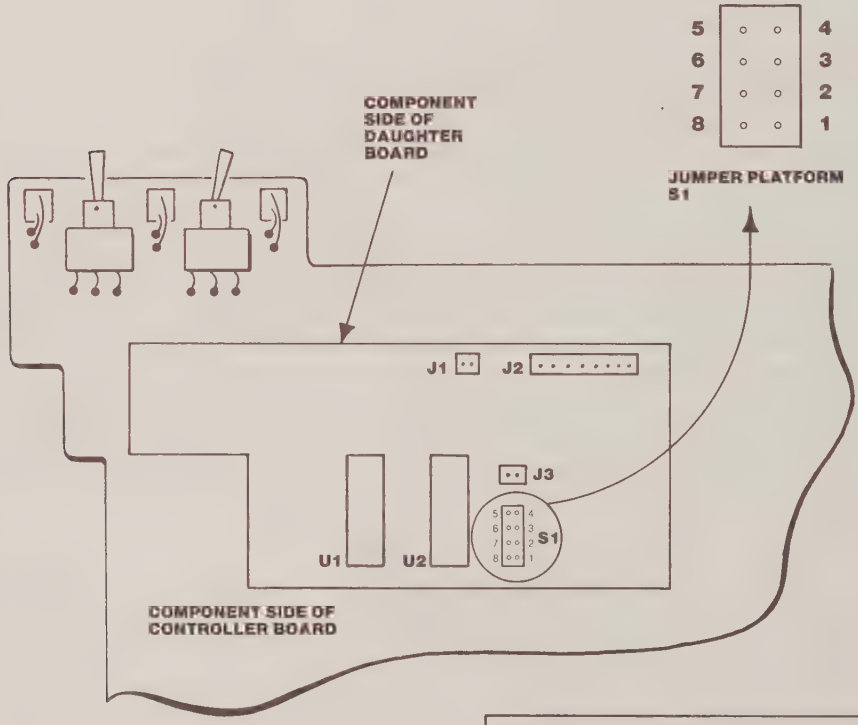
e. Carefully pull the jumper strap from position 4 on S1 and insert across position 5-4 on S1.

CAUTION

Do not change the jumper strap configurations at positions 6-3, 7-2, or 8-1 on platform S1. These jumpers were properly configured at the factory for your particular installation.

f. Reinstall the printer cover; secure the cover to the chassis with the four Phillips head screws.

g. Restore power to the printer.



CAUTION

DO NOT CHANGE THE JUMPER STRAP CONFIGURATIONS AT POSITIONS 6-3, 7-2, OR 8-1 ON PLATFORM S1. THESE JUMPERS WERE PROPERLY CONFIGURED AT THE FACTORY FOR YOUR PARTICULAR INSTALLATION; ANY OTHER CONFIGURATION MAY CAUSE DAMAGE TO THE PRINTER.

Figure E-1. International Character Set Jumper Strapping

Table E-2
International Character Set Function Select Switch Settings

Character Set	Set No.	Correspondence Quality DIP S4 Switch Settings				Draft Quality DIP S4 Switch Settings (Valid Only With Sprint Mode™ Option Installed)			
		SW1	SW2	SW3	SW4	SW1	SW2	SW3	SW4
United States	1	OFF	OFF	OFF	OFF				
United States	2					OFF	OFF	OFF	ON
English 1	3	OFF	OFF	ON	OFF				
English 1	4					OFF	OFF	ON	ON
English 2	5	OFF	ON	OFF	OFF				
English 2	6					OFF	ON	OFF	ON
French	7	OFF	ON	ON	OFF				
French	8					OFF	ON	ON	ON
Norwegian	9	ON	OFF	OFF	OFF				
Norwegian	10					ON	OFF	OFF	ON
German	11	ON	OFF	ON	OFF				
German	12					ON	OFF	ON	ON
Swedish	13	ON	ON	OFF	OFF				
Swedish	14					ON	ON	OFF	ON
Spanish	15	ON	ON	ON	OFF				
Spanish	16					ON	ON	ON	ON

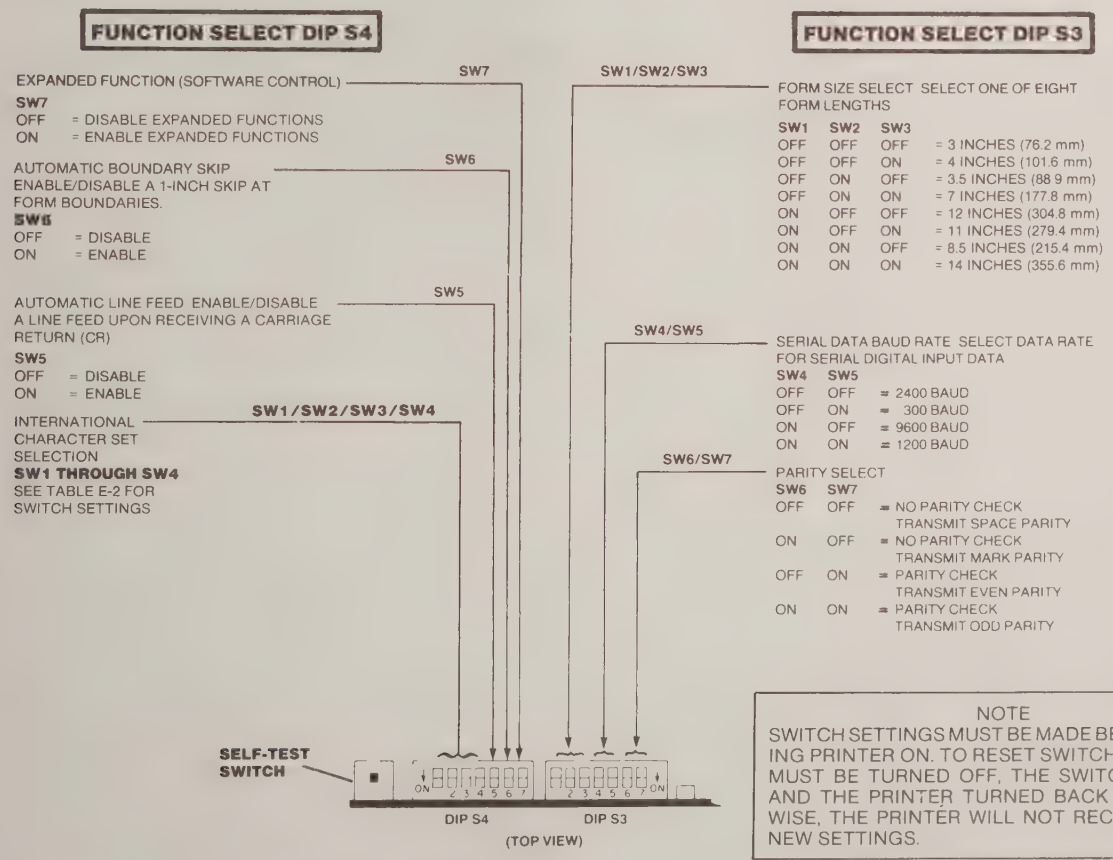

FUNCTION SELECT DIP S4
FUNCTION SELECT DIP S3
EXPANDED FUNCTION (SOFTWARE CONTROL)
SW7
SW7
OFF = DISABLE EXPANDED FUNCTIONS
ON = ENABLE EXPANDED FUNCTIONS
AUTOMATIC BOUNDARY SKIP
ENABLE/DISABLE A 1-INCH SKIP AT
FORM BOUNDARIES.
SW6
SW6
OFF = DISABLE
ON = ENABLE
AUTOMATIC LINE FEED ENABLE/DISABLE
A LINE FEED UPON RECEIVING A CARRIAGE
RETURN (CR)
SW5
SW5
OFF = DISABLE
ON = ENABLE
INTERNATIONAL
CHARACTER SET
SELECTION
SW1 THROUGH SW4
SEE TABLE E-2 FOR
SWITCH SETTINGS
SW1/SW2/SW3/SW4
SW1/SW2/SW3
FORM SIZE SELECT SELECT ONE OF EIGHT
FORM LENGTHS
SW1 SW2 SW3
OFF OFF OFF = 3 INCHES (76.2 mm)
OFF OFF ON = 4 INCHES (101.6 mm)
OFF ON OFF = 3.5 INCHES (88.9 mm)
OFF ON ON = 7 INCHES (177.8 mm)
ON OFF OFF = 12 INCHES (304.8 mm)
ON OFF ON = 11 INCHES (279.4 mm)
ON ON OFF = 8.5 INCHES (215.4 mm)
ON ON ON = 14 INCHES (355.6 mm)
SW4/SW5
SERIAL DATA BAUD RATE SELECT DATA RATE
FOR SERIAL DIGITAL INPUT DATA
SW4 SW5
OFF OFF = 2400 BAUD
OFF ON = 300 BAUD
ON OFF = 9600 BAUD
ON ON = 1200 BAUD
SW6/SW7
PARITY SELECT
SW6 SW7
OFF OFF = NO PARITY CHECK
TRANSMIT SPACE PARITY
ON OFF = NO PARITY CHECK
TRANSMIT MARK PARITY
OFF ON = PARITY CHECK
TRANSMIT EVEN PARITY
ON ON = PARITY CHECK
TRANSMIT ODD PARITY
SELF-TEST
SWITCH
ON
1 2 3 4 5 6 7
DIP S4
DIP S3
(TOP VIEW)
NOTE
SWITCH SETTINGS MUST BE MADE BEFORE TURNING PRINTER ON. TO RESET SWITCHES, PRINTER MUST BE TURNED OFF, THE SWITCHES RESET, AND THE PRINTER TURNED BACK ON. OTHERWISE, THE PRINTER WILL NOT RECOGNIZE THE NEW SETTINGS.

Figure E-2. International Character Set Function Select Switch Configuration

APPENDIX F
CIRCUIT BOARD ASSEMBLY DRAWINGS AND SCHEMATIC DIAGRAMS

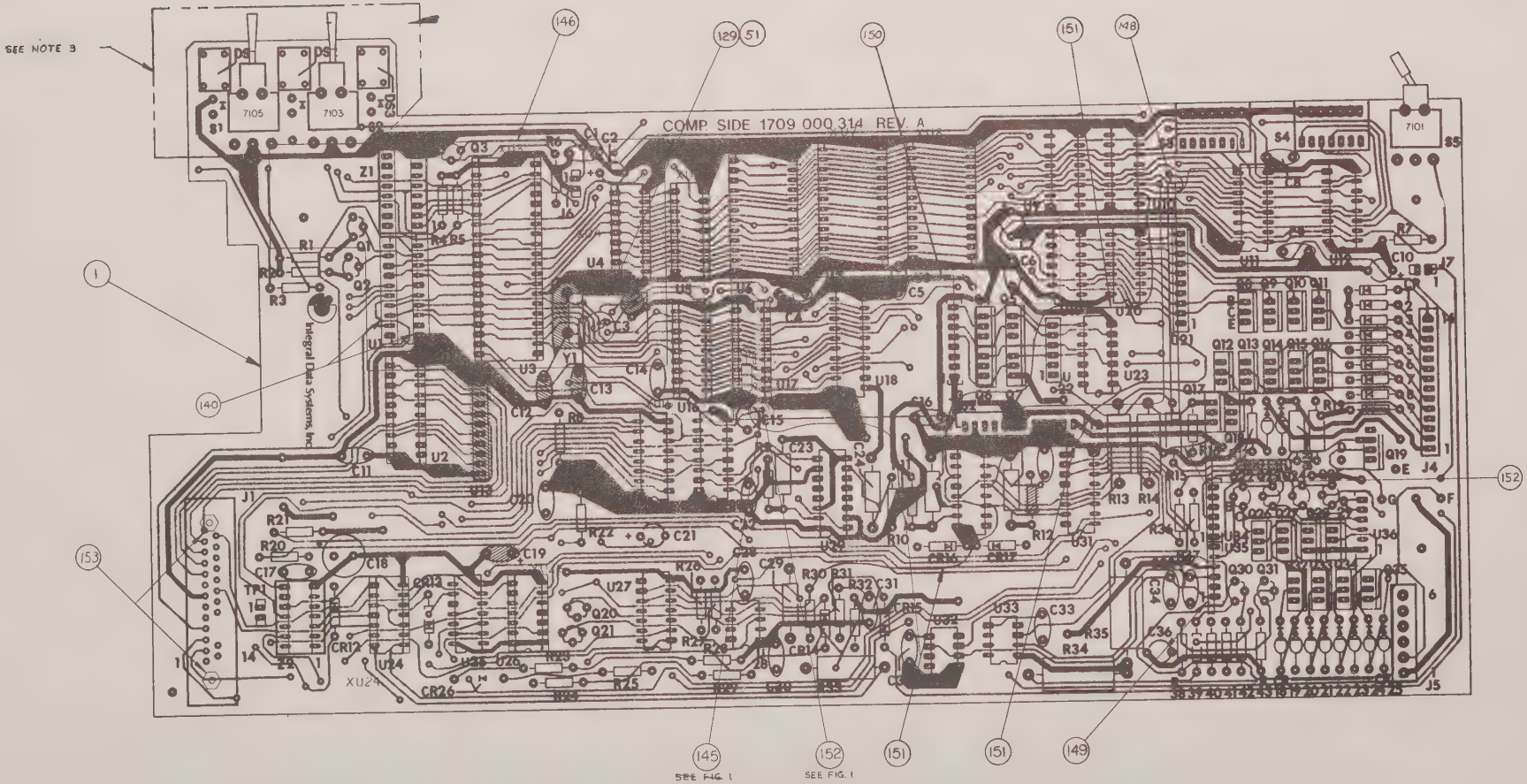


Figure F-1. PRISM 80 Printer Controller Circuit Board Assembly Drawing

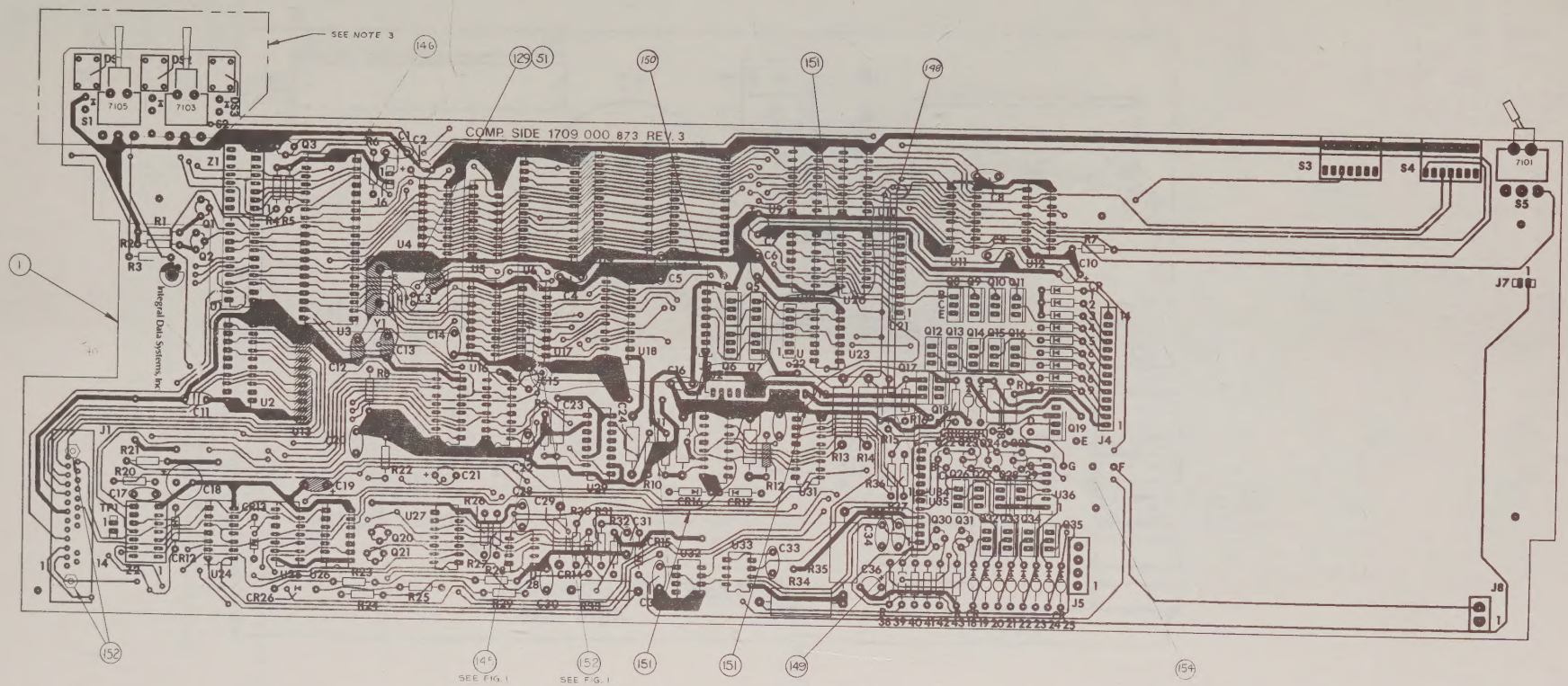


Figure F-2. PRISM 132 Printer Controller Circuit Board Assembly Drawing

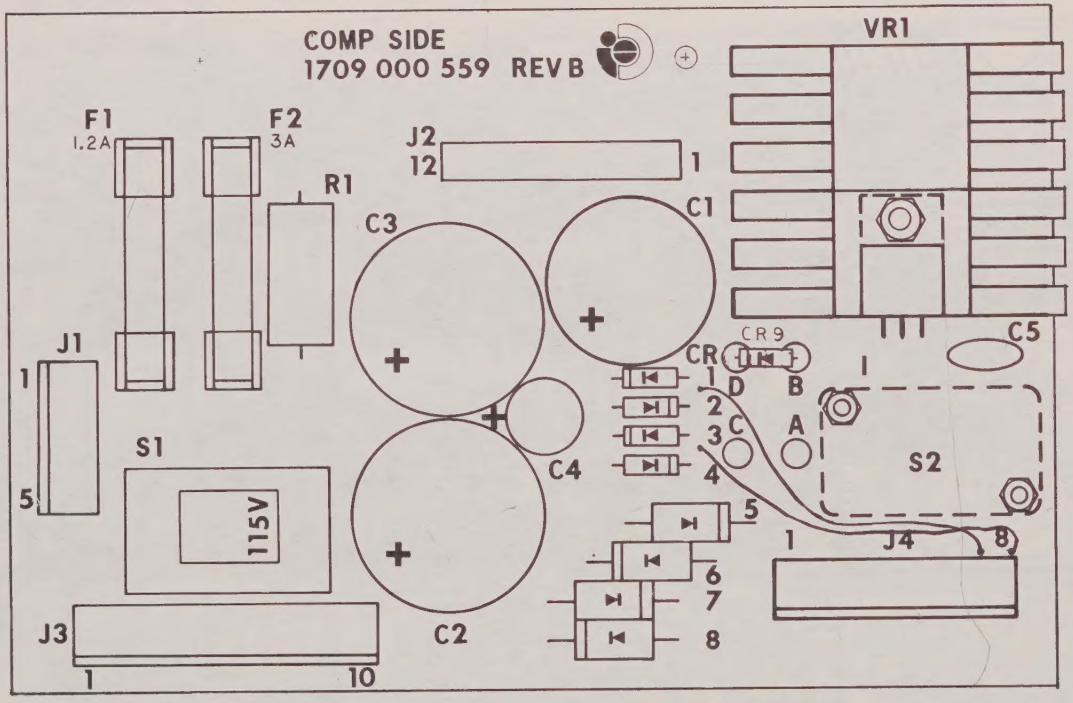


Figure F-3. Power Supply Circuit Board Assembly Drawing

CONTROL CODE REFERENCE TABLE

The following is a quick reference to the control codes used by the PRISM Printer™ when expanded function DIP S4 switch SW7 is *On*.

Printer Function	Keyboard Control Code	ASCII Control Code	Decimal Code	Hexadecimal Code
Printer				
Select	CTRL-Q	DC1	17	11
Deselect	CTRL-S	DC3	19	13
Print Mode				
Normal	CTRL-B	STX	02	02
Expanded	CTRL-A	SOH	01	01
Print Density				
10 cpi	CTRL-]	GS	29	1D
12 cpi	CTRL-↑	RS	30	1E
16.8 cpi	CTRL-_	US	31	1F
Character Spacing				
Fixed	CTRL-F	ACK	06	06
Proportional	CTRL-P	DLE	16	10
Justify				
On	CTRL-D	EOT	04	04
Off	CTRL-E	ENQ	05	05
New Line	CTRL-Z	SUB	26	1A
Tabs				
Horizontal	CTRL-I	HT	09	09
Vertical	CTRL-K	VT	11	0B
Vertical Advance				
ADV-1 w/o CR	CTRL-R	DC2	18	12
ADV-1 and CR	CTRL-J	LF	10	OA
ADV-2 w/o CR	CTRL-T	DC4	20	14
ADV-2 and CR	CTRL-N	SO	14	OE
ADV-3 w/o CR	CTRL-Y	EM	25	19
Carriage Return	CTRL-M	CR	13	OD
Line Feed	CTRL-J	LF	10	OA
Form Feed	CTRL-L	FF	12	OC
Programming	CTRL-⊏	ESC	27	1B
Back Space	CTRL-H	BS	08	08
Optional Graphics Mode	CTRL-C	ETX	03	03

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1036132

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PRINTED IN U.S.A.